RESPONSE TO COMMENTS

In Regard To

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Permit Prepared for Issuance to:	Acadia Aquaculture, Inc Mt. Desert, Maine
For Discharge to the Waters of:	Blue Hill Bay East of Dunham's Cove, Long Island Blue Hill, Maine
Permit Number:	ME0036234

Prepared by:
EPA - New England
Boston, Massachusetts

February 21, 2002

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BACKGROUND

During the period September 25, 2000 to November 23, 2000, the United States Environmental Protection Agency (EPA) and the Maine Department of Environmental Protection (DEP) solicited written public comments on a draft NPDES permit developed pursuant to an application submitted by Acadia Aquaculture Inc. for the discharge of waste products from a concentrated animal feeding operation (growing of Atlantic Salmon) into the waters of Blue Hill Bay off of Dunham's Cove in Blue Hill, Maine. EPA also held a public hearing on November 14, 2000 at the Town Office Auditorium in Blue Hill, Maine in order to solicit additional oral and written comment on the draft permit. During the comment period, EPA received 42 letters of comment. At the public hearing, 22 speakers provided oral comments and 13 written documents were submitted to EPA.

Since the close of the public comment period, EPA has conducted dialogues with the DEP and the Maine Department of Marine Resources (DMR) regarding the certain aspects of the permit which pertain to programs of these agencies. EPA has also been in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service concerning the terms of terms of this permit in regard to the Endangered Species Act listing of a Distinct Population Segment of Anadromous Atlantic Salmon within the Gulf of Maine. That consultation is now complete.

EPA has made a final decision to issue the permit authorizing the discharge. However, as a result of the written and oral comments received from the public and from state and federal stakeholders, a number of changes have been incorporated into the final permit. EPA has received certification by the DEP that the revised draft will not lower the quality of the receiving waters below the minimum requirements of the SB Classification and will satisfy the appropriate requirements of Maine Law.

This response to comments document describes and responds to comments received and describes the changes that have been made to the final permit as a result of those comments.

A copy of the final permit may be obtained by writing or calling the Municipal Assistance Unit of the Office of Ecosystem Protection, One Congress Street - Suite 1100 (CMU), Boston, MA 02114: Telephone: (617) 918-1610.

Comment Period: September 25, 2000 to November 23, 2000

Public Hearing Date: November 14, 2000

Location of Public Hearing: Town of Blue Hill Auditorium
Blue Hill, Maine

REPRESENTATIVES OF ORGANIZATIONS COMMENTING ON THE DRAFT PERMIT

Acadia Aquaculture Inc.

Individual Residents of Blue Hill, Maine and Surrounding Towns

Friends of Blue Hill Bay

Maine Oceanographic Services

Friends of Blue Hill Bay Legal Representative

Marine Environmental Research Institute

Blue Hill Board of Selectmen

Acadia National Park

Maine's Best Seafood Inc.

Friends of Taunton Bay

Kollegewigwok Yacht Club

Maine Windjammer Fleet

Maine Coast Heritage Trust

National Environmental Law Center

U.S. Public Interest Research Group

Sierra Club

MER Assessment Corporation

Bellwether Consulting Inc.

Great Eastern Mussel Farms

Univ. of Maine

Univ. of Cincinnati

Maine Department of Marine Resources

Maine Department of Environmental Protection

U.S. Fish and Wildlife Service

National Marine Fisheries Service

LIST OF ACRONYMS

The following is a list of acronyms used throughout this document.

- BAT - Best Available Technology Economically Achievable
- BMP - Best Management Practice
- BPJ - Best Professional Judgement
- CAAPF - Concentrated Aquatic Animal Production Facility
- CWA - Federal Clean Water Act
- DEP - Maine Department of Environmental Protection
- DMR - Maine Department of Marine Resources
- DO - Dissolved Oxygen
- DPS - Distinct Population Segment
- EFH - Essential Fish Habitat
- EPA - U. S. Environmental Protection Agency
- ESA - Endangered Species Act of 1973
- FAMP - Finfish Aquaculture Monitoring Program
- FDA - U.S. Food and Drug Administration
- FWS - U.S. Fish and Wildlife Service
- GPS - Global Positioning System
- INAD - Investigational New Animal Drug
- MERI - Marine Environmental Research Institute
- MOS - Maine Oceanographic Services
- NELC - National Environmental Law Center
- NMFS - National Marine Fisheries Service
- NOAA - National Oceanic and Atmospheric Administration
- NPDES - National Pollutant Discharge Elimination System
- NPS - National Park Service
- NRC - National Response Center
- RHA - Rivers and Harbors Act of 1899
- TOC - Total Organic Carbon
- US PIRG - U.S. Public Interest Research Group
- WQS - Water Quality Standards

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INTRODUCTION

The U.S. Environmental Protection Agency (EPA) received numerous comments on this draft permit during the public comment period, September 24 - November 24, 2000, including oral comments received during a public hearing held in Blue Hill on November 14, 2000. Pursuant to 40 CFR §124.17 (a)(2), EPA is required to briefly describe and respond to all significant comments on the draft permit raised during the public comment period, or during any hearing. EPA has responded collectively to multiple comments that address the same issue, but the identification of all individuals providing comments may not be included. In most cases, those who have provided significant comments are identified, and the comments are presented as they appeared in their original form, however, some have been abbreviated or paraphrased, but retain the key elements of the comment.

This document contains three sections. Section I identifies and explains the significant changes made to the draft permit. Section II is a summary, in tabular form, of the significant and other notable changes to the draft permit. An explanation for these changes have been included in the table, or found by reference within Section III. Section III, Response to Comments, is divided into six major categories: 1) Nutrients, Water Quality, and Physical Characteristics of Blue Hill Bay; 2) The Discharge of Drugs and Other Potentially Toxic Pollutants; 3) Mixing Zones and Impacts to the Sea Floor; 4) Impacts to Protected Species; 5) Compliance With Permit Conditions; and 6) Other Issues.

I. SIGNIFICANT CHANGES TO THE DRAFT PERMIT

A. Limiting Nutrient Input

The draft permit limited the number of fish the permittee could stock at the Dunhams Cove site to the historical maximum stocking level in Blue Hill Bay (i.e. the maximum stocking level at the Hardwood Island site,) not to exceed 500,000 fish (Section D.1 in the draft permit). The intention of this permit condition was to limit the amount of nutrients introduced to Blue Hill Bay from salmon farming to no more than the historic maximum until a better understanding of the bay's nutrient levels and assimilative capacity could be established. Several who commented questioned this approach, and the accuracy of the 500,000 maximum. The comments received prompted EPA to re-evaluate this approach to limiting nutrients. Since the discharge of feed is the source of nutrient input, either directly from unconsumed feed, or indirectly through fish waste excretion, EPA decided that limiting the discharge of feed to historic levels would be a more accurate and appropriate approach to regulating the input of nutrients into Blue Hill Bay.

The final permit has removed any reference to a 500,000 fish limit. Instead, it includes an annual maximum limit of 2,151,000 pounds of feed to be discharged at both the Dunhams Cove and Hardwood Island sites combined (See Section C.2 in the final permit). The annual limit represents the maximum feed used in a 12 month period, based on EPA's review of three years of feed use and purchase records provided by the permittee's sole feed vendor. This limit is intended to prevent the introduction of significant amounts of additional nutrients into Blue Hill Bay from salmon farming until there is a better understanding of current nutrient levels, what limits phytoplankton production in the bay, and how effectively the bay is able to assimilate additional nutrients. Following the completion of bay-wide nutrient monitoring and flushing studies, the permit may be modified to reflect new information, with the opportunity for public comment.

B. Regulating the Discharge of Drugs

The draft permit allowed the discharge of medications approved, or authorized for investigational use, by the Food and Drug Administration (See Section B in the draft permit). Permit conditions were included specifically for the discharge of the drug cypermethrin, which at the time was the only drug authorized under FDA's Investigational New Animal Drug (INAD) program for the treatment of sea lice. There was, and still is, no drug approved by FDA for the treatment of sea lice in net pens. Based on the numerous comments received, as well as information provided

by FDA and EPA's Office of Pesticide Programs, EPA concluded that the potential adverse effects to aquatic organisms associated with the discharge of cypermethrin in Blue Hill Bay would not be consistent with Maine's water quality standards. As a result, EPA intended to prohibit the discharge of cypermethrin from this facility until such time that FDA had received and reviewed sufficient environmental toxicity data to make a determination on the drug's approval. In the summer of 2001, the sponsor of cypermethrin withdrew its application to FDA seeking approval of the drug which means that, at present, its use is prohibited at all salmon farms in Maine. Therefore, EPA has removed from the final permit any mention of cypermethrin, and any special monitoring requirements specifically associated with its discharge. The final permit prohibits the discharge of any unapproved drug, including drugs authorized under the INAD program. Should the permittee request authorization by EPA to discharge drugs not approved by FDA, including INAD drugs, a permit modification will be required which includes an opportunity for public review and comment. EPA understands that through the FDA's INAD program many of the necessary environmental studies can be conducted. Nevertheless, EPA has decided to prohibit the discharge of any other INAD drug at this site since the potential for such drugs to cause a violation of water quality standards has not been assessed by EPA, and the public has not had an opportunity to review and comment on the discharge of a new pollutant. Further, prohibiting the discharge of INAD drugs at this facility will not prevent or impede studies from being conducted under the INAD program at other facilities. EPA intends to work with DEP, FDA, other state and federal agencies, the industry, and the public in establishing how best to accommodate the need to study unapproved drugs under the INAD program while ensuring that water quality standards are protected.

The draft permit prohibited any prophylactic use of drugs. A comment received suggested that such preventative treatments are sometimes warranted to better manage infectious disease transmission, and would benefit not only cultured salmon, but wild Atlantic salmon, as well. This prompted EPA to contact fish health experts from several state and federal agencies, including NMFS. Based on these discussions, it appears that the prophylactic use of drugs may at times be warranted to minimize the transmission of disease between cultured stocks, and potentially to wild stocks. EPA has therefore revised this restriction to allow the discharge of FDA approved drugs in a preventative manner, on a case-by-case basis, provided that EPA first grants permission to the permittee in writing.

C. Nutrient Monitoring

The permittee has expressed concern that limits placed on the number of salmon stocked, or the amount of feed used at his facilities, inhibit his ability to operate in a cost-effective and competitive manner since there are no similar restrictions imposed on any existing farms in Maine. While EPA recognizes this inconsistency, there is concern that the physical characteristics of Blue Hill Bay may limit the bay's capacity to assimilate significant increases in nutrients. In addition, the nutrient levels in the bay are at present not well understood. Therefore, before any significant increase in nutrient loading is authorized, the nutrient levels in Blue Hill Bay need to be better quantified and the bay's flushing capacity assessed.

The draft permit required nutrient monitoring be conducted at various depths within a single pen, 5 meters downcurrent from the pen system, and at a position approximately 500 meters north of the facility. EPA received numerous comments reflecting concern that nutrients introduced from this facility could cause or contribute to harmful algal blooms. The comments prompted EPA to reconsider the adequacy of the permit's nutrient monitoring conditions to ensure collecting these data contributes to a better understanding of the bay's existing nutrient levels. As a result, in-pen monitoring and monitoring 5 meters from the pen system were dropped from the final permit since the diffuse nature of this discharge precludes the accurate measurement of nutrients being discharged into the bay. Alternatively, five sites have been selected for monitoring nutrients, one each at the following approximate distances from the pen system: 100 meters north, 100 meters south, 800 meters southwest (in Dunhams Cove,) 1,200 meters east, and one 5,200 meters west, located on the west side of Long Island. The monitoring site located west of Long Island was included by Maine DEP in its water quality certification. This monitoring will provide nutrient data for the area of Blue Hill Bay in proximity to the permittee's site, and help EPA evaluate whether or not any increase in nutrient input is appropriate.

In addition to changing the sampling locations, the list of nutrients and other water quality parameters to be

monitored has increased in the final permit in order to support a larger nutrient sampling effort being conducted in Blue Hill Bay by Maine Department of Marine Resources (DMR). DMR is conducting a multi-year study to determine if the bay is nutrient-limited, in which case the significant increase of nutrients from salmon farms or any source may cause a problem, or limited in some other respect. The draft permit required sampling for total phosphorus, ammonia nitrogen, and nitrate and nitrite nitrogen (See Section A of the draft permit). The final permit adds total organic nitrogen, total nitrogen, and dissolved silicates to this list these parameters, all of which may be present in the discharge. Also, in order to monitor changes in the phytoplankton community, the final permit requires collecting samples for chlorophyll *a*, phaeophytin, presence and abundance of dominant and noxious phytoplankton, as well as measuring water transparency.

D. Mixing Zone

The draft permit established mixing zones for non-toxic materials and toxic materials (See Section E of the draft permit). The mixing zone for non-toxic materials was defined as "the area extending 5 meters beyond the perimeter of the net pen structures in all directions of the surface, and extending down to and including the sea floor." These boundaries were consistent with those informally established by DMR early in the inception of the Department's Finfish Aquaculture Monitoring Program (FAMP) for the salmon farming industry. While most comments were directed at the mixing zone for toxic materials, some expressed concern that the mixing zone for non-toxic materials was too small, did not allow for shifting of the pens due to the influence of tides and wave action on the moorings, and was inconsistent with mixing zones established for salmon farming in other states and countries.

1. Non-toxic materials EPA reviewed the mixing zones used in Washington State, Scotland, and in British Columbia and New Brunswick, Canada. EPA also re-evaluated how realistic it was to set mixing zone boundaries in the water column and seafloor at 5 meters from the pen system, based on the conditions at the Dunhams Cove site, and the results of environmental monitoring at salmon farms in Maine, as summarized in the document "Overview of Maine Department of Marine Resources Finfish Aquaculture Monitoring Program: Eight Years of Monitoring, 1992-99." As a result of this re-evaluation, EPA concluded that a mixing zone for the water column should remain at 5 meters. Both the State of Washington and the Canadian Province of New Brunswick provide no area of mixing for the water column beyond the bounds of the pen system. The document developed for DMR, which included a summary of monitoring at existing sites in Maine, indicated that approximately 95% of the dissolved oxygen (DO) saturation samples taken at 5 and 100 meters from a net pen facility recorded acceptable levels (i.e., above 85%). Most of the DO events below 85% were limited to a few sites that experienced repeated DO problems. Some of these same sites also experienced elevated levels of benthic degradation associated with organic loading. This would suggest that, at least in some locations, chronic DO depression may provide a warning that impacts to the seafloor are occurring.

EPA renamed the mixing zone for the sea floor the "sediment impact zone" since very little physical mixing is likely to occur at this site once solids have settled onto the substrate. Several comments prompted EPA to reconsider the spatial limits of the draft sediment impact zone, which covered the area of the net pen system, and extended out 5 meters in all directions. Based on the site's average water depth (45 meters,) average current velocity (7.6 cm/sec.,) prevailing current directions (north/south,) and an established settling rate of feed pellets (10 cm/sec.,) EPA calculated that most unconsumed feed will likely settle out onto the sea floor within approximately 30 meters, to the north and south of the pen system. Many existing facilities orient their cages along the axis of the predominant tidal current flow in order to minimize drag, and the resulting wear and strain on the mooring system. This orientation tends to concentrate organic loading on the seafloor roughly to within the footprint of the pen system and adjacent bottom along the axis of the pen system, particularly in shallower water (e.g. < 20 meters). The permittee's pen system, which will represent one of the deepest salmon farm sites in Maine (averaging 45 meters,) will run perpendicular to the tidal current flow. This orientation should distribute organic material more broadly to the adjacent sea floor, north and south of the pen system, but in lower concentrations. Based on this re-evaluation, EPA has extended the Sediment Impact Zone out to 30 meters in all directions from the pen system. The combined areal extent of the net pen system and 30 meter sediment impact zone represents approximately 5.4 acres of the

permittee's 35 acre lease site.

Organic loading to the sea floor should gradually diminish to near ambient levels within 30 meters of the net pen system. While some level of organic enrichment is expected in this transitional area, EPA has included in the monitoring plan numeric warning levels that trigger the need for additional sampling if adverse benthic impacts are identified. If warning levels are exceeded in Sediment Impact Zone II (5-30 meters from pen system,) the permittee is required to collect sufficient samples at 30 meters from the pen system and the appropriate reference site to determine whether or not impact limits established for the edge of the sediment impact zone and beyond ($\geq$30 m) have been exceeded. Exceedence of any warning level will serve as a warning to the permittee that corrective actions should be undertaken in order to maintain acceptable conditions within and beyond the Sediment Impact Zone. A permit violation will occur if conditions under the pens and out to 30 meters exceed established impact limits for redox potential, gas formation, *Beggiatoa*-type bacterial mat coverage, anoxia, significant reduction in mean total abundance, or absence of infaunal organisms (see Section E in the final draft permit). A violation will also occur if the number of pollution-sensitive taxa and total taxa (i.e. taxa richness) found at 30 meters from the pen system are significantly less than reference site values, as determined using statistical analysis. These limits are intended to ensure Maine's water quality standards for Class SB waters are maintained at the edge of the Sediment Impact Zone.

2. Toxic materials As previously stated, the original draft permit included a mixing zone for toxic materials (See Section E.2 in draft permit). There were many comments related to the discharge of toxic pollutants in general, and drugs in particular. In response to these comments and because the discharge of cypermethrin was to be prohibited in the final permit, EPA deleted any specific reference to a mixing zone for toxic pollutants, and clarified what constitutes a discharge into waters of the United States at a net pen salmon farm in Maine. The following is Section I.1 of the final permit:

> The discharge of toxic pollutants into the waters of the United States in concentrations toxic to aquatic organisms is prohibited. Waters within the confines of the net pens are waters of the United States. Testing of the effluent for the presence of toxic pollutants in the water column will not be required routinely since the normal discharge is expected to be free of toxic pollutants in toxic concentrations.

E. Benthic Impact Criteria

Some comments EPA received questioned how benthic impacts could be assessed without comparing conditions near the pen system with conditions beyond the influence of the pens. The creation of a Sediment Impact Zone would have minimal value without developing numeric criteria that provide, in advance, measurable parameters for assessing whether or not benthic conditions are within acceptable levels. At present, Maine has a narrative water quality standard which requires that the receiving waters shall be of sufficient quality to support all estuarine and marine species indigenous to the receiving waters without detrimental changes in the resident biological community. For the purpose of this permit, EPA has compiled a set of biological and chemical metrics that assess the health of the seafloor both within and beyond the influence of the pen system. Specific thresholds have been established to warn EPA and the permittee that benthic conditions are deteriorating. This should provide the permittee the opportunity to take remedial actions sufficient to prevent further degradation, and to stay within acceptable levels. The exceedence of a second threshold called an "impact limit" would constitute a permit violation. Permit violations will be evaluated by EPA to determine the appropriate enforcement response (See Section E in the final draft permit).

The metrics used as impact thresholds include the following: redox potential, gas formation, *Beggiatoa*-type bacterial mat coverage, anoxic sediments, azoic conditions, and significant reductions in pollution-sensitive and total taxa. These were compiled from a number of sources and reflect an effort to monitor multiple chemical and biological indicators of benthic habitat health. Some metrics, such as the formation of gas, *Beggiatoa* coverage, species hyper-dominance, and the presence of anoxic sediments, are derived from early guidelines developed by DMR, with input from Maine DEP, EPA, National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (FWS), the Army

Corps of Engineers (Corps), and the industry. These metrics, though never codified, were accepted by regulatory and resource agencies as minimum levels of habitability within the footprint of the pen system when it became apparent in the early nineties that this growing industry required some level of regulatory control.

The technique included in the final permit for measuring reduction-oxidation (redox) potential has become a monitoring standard in New Brunswick, Canada and Scotland. In New England, redox potential is being used by university and federal researchers to accurately assess the depth of the oxic layer in marine and estuarine sediments. The thresholds established in the final permit correspond closely with the sediment condition rating scale established by Canada for the Bay of Fundy, as well as numeric limits established by the Scottish Environmental Protection Agency.

This final permit identifies additional species that are likely to disappear or increase in numbers, depending on their tolerance to organic loading. Benthic warning levels have been established to provide early warning that bottom conditions are deteriorating, as compared to two reference sites, and in some cases automatically triggers the requirement for additional sampling. Impact limits are numeric values that, if exceeded, represent either unacceptable conditions on the sea floor, or an unacceptable loss of resident benthic infauna, and therefore, a violation of water quality standards.

Note: EPA recently received information from Maine DMR which indicated that benthic conditions beneath and adjacent to the permittee's existing facility located near Hardwood Is. have deteriorated compared to previous inspections. DMR has required the permittee to take remedial action in order to allow recovery of the seafloor to acceptable conditions. While EPA is concerned about the reported benthic conditions at this site, which may be related to increased production in 2001, it feels confident that impacts associated with organic loading at the Dunhams Cove site would be flagged by the monitoring parameters included in this permit well before conditions deteriorated to the levels observed in recent video surveys at the Hardwood Is. site. Further, benthic degradation significantly less than levels observed at the Hardwood Is. site this fall would have triggered one or more permit violations, prompting EPA to take appropriate enforcement action.

F. Benthic Monitoring

The draft permit contained benthic monitoring consistent with the requirements of DMR's original Finfish Aquaculture Monitoring Program (FAMP) design once every other year. This included sampling sediments for grain size, the redox potential discontinuity layer, depth of the unconsolidated layer, total organic carbon, and benthic infauna. In 1996, all of these monitoring parameters, except for benthic infauna analysis, were dropped from the FAMP. Based on comments by DMR and others, EPA re-evaluated the value of these parameters and decided to replace them in the final permit (with the exception of redox potential) with other parameters that should provide data of greater value. EPA believes that redox potential monitoring at this site, which measures the depth of the oxygen-bearing sediments, will provide a good indication of spatial and temporal changes in sediment conditions critical to many infaunal organisms.

The benthic monitoring plan in the final permit is designed to provide information on benthic conditions, and identify any exceedance of established warning and impact limits within the footprint of the pen system, and north and south of the pen system within and beyond 30 meters from the pen system (See Section F.1 of the final permit). It also requires two reference stations be selected; one approximately one mile north of the pen system, and another one mile south or east. This will allow comparisons to be made between similar substrates within and beyond the influence of the salmon farm discharge.

Several comments received on the draft monitoring plan prompted EPA to reexamine the frequency of benthic infauna monitoring. State narrative water quality standards for class SB waters require that receiving waters shall be of sufficient quality to support all estuarine and marine species indigenous to the receiving water without detrimental changes in the resident biological community. Impacts associated with organic loading are likely to affect benthic infauna more than most other organisms due to their relatively sedentary nature which inhibits their avoidance of

undesirable conditions, and their reliance on dissolved oxygen within and in close proximity to the substrate. Given the importance of monitoring impacts to infaunal organisms as a mechanism for assessing whether or not water quality standards are being maintained, EPA concluded that benthic monitoring should be conducted annually between August 1 and September 30, versus every two years as the draft permit requires.

Changes in the video/photo survey requirements in the final permit reflect the understanding that normal diver operated video surveys would not be realistic at this site given water depths ranging from 40 to 60 meters. The final permit requires a video transect or series of still photographs that run the length of the net pen system on the upcurrent side. With a slight shift in the pens associated with tidal current, this transect should provide visual information on the conditions within the footprint of the pen system. Two additional transects, heading in opposite directions from the midpoint of the pen system, should provide visual information along the predominant current flow from the pens to 60 meters north and south of the pens (See Section F.2 in the final permit).

G. Federally Protected Species

Under section 7(a)(2) the Endangered Species Act (ESA,) any federal agency must insure that any action it authorizes is not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of critical habitat. Through formal consultation with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS,) - collectively referred to as "the Services" - a biological opinion was developed by the Services which concluded that the issuance of the draft permit, including all conditions specified therein, is not likely to jeopardize the continued existence of the Atlantic salmon Gulf of Maine DPS. While the permit has changed considerably from its draft form, conditions related to the protection of listed salmon have remained essentially unchanged. The Services concluded that the changes made to the draft permit, as reflected in the final permit, do not change the basis of their conclusion in the biological opinion. In addition, the Services concurred with EPA's conclusion that this facility was not likely to adversely affect marine mammals protected under the ESA.

The draft permit was released for public review on September 24, 2000, prior to EPA's completion of consultation requirements with NMFS and FWS (collectively referred to as "the Services") under section 7 of the Endangered Species Act (ESA). A distinct population segment (DPS) of anadromous Atlantic salmon in the Gulf of Maine was listed as an endangered species on November 17, 2000. Following formal consultation with the Services, which resulted in their preparation of a Biological Opinion, only minor changes have been made to the conditions listed in Section G of the draft permit. Unchanged in the final permit are conditions prohibiting the use of non-North American strains of Atlantic salmon and transgenic salmonids, and a requirement that each fish carry a mark which identifies it to the facility (See Section J of the final permit).

Some of the conditions related to the protection of the federally listed Atlantic salmon contained in this final permit are not included in existing permits issued by the Corps issued under section 10 of the Rivers and Harbors Act (RHA) for the salmon farm industry. On August 9, 2001, the Corps initiated ESA consultation with the Services concerning protection of the DPS of Atlantic salmon from adverse affects associated with existing and proposed salmon farms. This effort is expected to result in industry-wide permit conditions on the subject of marking, codes of containment, inventory control, and other areas similar to those outlined in Section J of the final permit. Such conditions would be included in existing and future Corps permits. EPA will consider modifying the special conditions in Section J of this final permit to bring this facility into conformance with Gulf of Maine industry practice, consistent with state water quality standards, upon completion of the Corps's ESA consultation and RHA section 10 permitting process. Prior to making any such permit modification, EPA would seek public comment, as well as re-initiate section 7 consultation with the Services.

We note that in its § 401 certification, DEP stated that consultations regarding measures to protect the Atlantic salmon are underway and that therefore the State has not determined whether the provisions in Condition J are necessary or appropriate to protect the populations of Atlantic Salmon listed under the Endangered Species Act. It considered the imposition of these conditions to be "solely a federal action." DEP may have confused the ongoing

consultation by the Corps on existing § 10 permits with the consultation needed for this NPDES permit. In fact, the conclusion developed by the Services in their Biological Opinion for this permit was based on the premise that all conditions in Section J "Special Conditions" would be maintained in the permit and enforced.

II. SUMMARY TABLE OF NOTABLE CHANGES TO THE DRAFT PERMIT

The following table provides a comparison of the draft permit for which comments were received and the final version issued to Acadia Aquaculture. The reason for a particular change in the permit is either briefly explained, or referenced to one or more comments listed in Section III.

2000 PN Draft Permit Section and Number	**2002 Final Permit Section and Number**	**Reason for Change Referenced Comments**
Section A. Effluent Limitations and Monitoring Requirements	**Now Section C.**	
A.1, A.2, A.3 DO saturation limits of 85%, 90% and 95% at pens	C.1 All limits now 85%	See Comment A.29
A.1, A.2, A.3 includes phosphorus and nitrogen monitoring at pens	C.1 deletes P and N monitoring and adds transparency sampling depth monitoring at pens	See Comments A.9, A.22, E.18
Monitor 1/Day	Monitor 1/Week	See Comment A.16
Water column monitoring period is July through September	Adds water quality monitoring in June	See Comment A.13
Footnote 1 allows non-compliance due to natural causes	Footnote 1 is expanded to say how natural causes are to be documented	EPA clarification See Comment A.39
A.4 Nutrient Monitoring in Pens	Deleted - shifted to farfield locations.	See Comment A.22
A.5, A.6 WET Testing	Tables deleted.	No longer applicable since discharge of unapproved drugs is prohibited.. See general discussion under Section B.
Section B. Project Size and Location	**Now Section A.** Requires net pen facility to be positioned after being secured to the seafloor.	See Comment A.9 EPA re-organization of permit layout
Description of Discharge	Description of Discharge separated. Still under Section B.	

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
Section C. Background Monitoring of water column for DO Sat and nutrients at a specified site about 450 meters north of the pens	**Section C.3** Deletes prior background site and adds water column background monitoring at five sites: 100m north and 100m south of site, within Dunhams Cove, 1200 meters east of pens, and one west of Long Island. Adds to monitoring total organic nitrogen, total nitrogen, silicates, chlorophyll, phaeophytin, transparency, tide and current data, and phytoplankton.	See C under Section I (Significant Changes) See Comments A.2, A.5, A.7, A.8, A.11,A.12, A.15, A.16, A.19, A.20, A.23, A.25., A.26, A.30, A.32, A.35, A.41
Section D. Narrative includes an on-site fish limit of no more than 500,000 fish for all facilities combined that are operated by the permittee in Blue Hill Bay	**Now Section G**. Narrative does not include on-site fish limit, but Table C.2 adds a total annual feed limit of 2.1 million pounds for the combined feed at both facilities in Blue Hill Bay operated by the same owner. C.2 also adds monthly reporting of the pounds of feed, numbers of fish, and average weight and age of fish at both facilities	See C under Section I (Significant Changes), and comments A.1, A.7, A.9, A.23, A.34, A.42
D. Conditions 4,6,8 include terms "adversely affect" and/or "contribute to"	G. "Adversely affect" changed to "cause adverse impact" Term "contribute to" deleted	See comments C.19, E.14
Section E. Mixing Zones	**Now Section D.** Allocated Impact Zones	
Specifies a sediment mixing zone extending 5m beyond the footprint of the pen system	Adds second zone from 5m out to 30 m out from the footprint of the pens	See D under Section I (Significant Changes)
Lists four sediment mixing zone ambient criteria to be met in the mixing zone and specifies that no impairment shall be allowed as judged by a comparison with documented baseline conditions.	**Now Section E.** Impact Thresholds Expands criteria to be met within the 5m mixing zone, the 5-30 m mixing zone, and beyond 30 meters	See E under Section I (Significant Changes)
Requires toxicity tests and a dye study upon discharge of cypermethrin for disease control	Deleted. Added to Section C.5 sediment chemistry testing for copper and zinc	See Comments B.5, B.13

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
Section F. Notifications for use of un-permitted pollutants	**Now Section H.** Numeric notification levels deleted. Replaced with immediate reporting requirement for discharge of any quantity of toxic pollutant not listed in permit	Not applicable to the permit. See Comment B.33
Section G. Special Conditions	**Now Section J.**	
Condition 4	Condition 4 now requires agency personnel to follow bio-security protocols at site	See Comment E.20
Condition 6 Fish detected in any river triggers requirement to conduct assessment of containment system	Condition 6 now prohibits the intentional release of live salmon. Fish detected in any DPS river triggers assessment. DPS rivers are identified.	ESA Section 7 consultation with Services
Condition 8 Requires submission of integrated loss control plan 30 days after permit issuance.	Condition 8 now requires submission of integrated loss control plan at least 45 days prior to transferring fish to facility. Loss control plan now identifies specific husbandry practices to be included in plan.	ESA Section 7 consultation with Services
Condition 9 Annual reporting requirement. Includes information on claiming confidentiality for reported data.	Condition 9 changed to monthly reporting to EPA. Language pertaining to confidentiality deleted, though ability to request confidentially still exists.	ESA Section 7 consultation with Services See Comment E.6
Condition 10 to report escapes of more than 500 fish to individuals at agencies within 24 hours	Condition 10 change to report any escapes to agencies within 24 hours	ESA Section 7 consultation with Services See Comment D.2

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
Condition 11 to report incidental take of marine mammals	Condition 11 deleted	Not applicable under CWA. See Comment D.12
Condition 12 requires approval from EPA and Corps before stocking species other than Atlantic salmon	Condition 12 now 11. Now requires only written approval from EPA.	Corps requirements covered under RHA Section 10 permit
Condition 13	Condition 13 deleted	Redundant with Section B in final permit
Section H. Water Column and Seafloor Monitoring	**Now Section F.** Benthic Monitoring, Video/Photo Surveys, and Water Quality Monitoring	
H.1. Diver/Video Survey Two transects to be done twice per year	Table C.4 and text of F.2 Video/Photo Survey adds a third transect. Includes specific requirements for photo/video monitoring	See F under Section I (Significant Changes). See Comments E.9, C.15
H.2. Water Quality Monitoring DO Saturation at Net Pen, 100m up and downcurrent every two weeks during July thru September at three depths plus one complete vertical profile in August	Replaced with weekly sampling 5 meters from pens. Table C.1 and C.3 and the text of F.3 include these requirements with the exception of the vertical profile in August which was deleted	See A.12, A.16, A.43, A.44
H.3.Benthic Analyses - Sediments Every other year measure and report grain size, depth of redox discontinuity and unconsolidated layer and TOC beneath net pens	Now Table C.5 and text of F.1 Annually, measure and report Redox Potential and depth of discontinuity, report evidence of gassing, azoic conditions and presence of *Beggiatoa* at 12 sample sites beneath and near pens, and at two benthic reference sites (approximately 1000m north or south and one approximately 1000m east of pens). May require additional sampling based on results. Identify organisms to lowest practical taxonomic level. May analyze at family level. Additional sampling may be required based on results.	See F under Section I (Significant Changes) See Comment C.7 See F under Section I (Significant Changes)

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
H.3.Infauna Monitoring Every other year collect samples from beneath pens, pass though 0.5 mm mesh sieve and identify infauna to species level.	Table C.6 and the text of F.1.b Annually collect samples, sort with 1.0 mm mesh sieve and determine overall abundance and abundance of pollution tolerant and sensitive species and taxa richness at 12 sites beneath and near pens and at two benthic reference sites (1000m north and 1000m south or east of pens). Identify organisms to lowest practical taxonomic level. May analyze at family level. Additional sampling may be required based on results.	See Comments A.36, C.5, C.7, C.8, C.13, C.14, C.15, C.16
H.4 Reporting Requires all dive and benthic survey reports, videos, and water quality monitoring to be submitted to EPA by December 15 of each year.	Reporting requirements consolidated in Section Q. Requires data reported in discharge monitoring report to be submitted to EPA and DEP monthly, spring video surveys within 60 days, fall video surveys and benthic monitoring by December 15.	Clarification of reporting requirements. Review of spring video monitoring data needs to be conducted prior to fall survey
Section I. BMPs For Fish Pen Operations	**Now Section K**. BMPs for Fish Pen Operations	
I.1 Required salmon carcasses removed from pens to be transported to a land-based facility	K.I Daily removal of fish carcasses required. Prohibits discharge of salmon carcasses and transport water. K.1 combines I.1 and I.2 from draft permit.	See Comment E.4
I.3 Specified how solid waste is to be disposed.	K.2. Prohibits disposal of feed bags and other solid wastes in receiving waters.	See Comment F.2
I.4 Required permittee to minimize discharge of net-fouling organisms	K.3. K.4 prohibits the discharge associated with power washing nets	See Comment A.28
I.5 and 6 Net fouling is to be controlled by non-chemical means	K.5. The discharge of biocides associated with sterilizing boats also prohibited.	See Comment B.7
I.8 Dropped nets are to be reported and removed within 30 days	K.7. Dropped nets are to be tagged, positioned by GPS, reported within 24 hours and removed with 30 days.	See Comment A.24

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
Section J. BMP for Disease Control	**Now Section L.**	
J.1. and 2. INAD drugs such as cypermethrin may be used	L.1. and 2. Discharge of unapproved drugs, including INAD drugs, is prohibited	See B under Section I (Significant Changes)
J.1. Type of drugs not specified	L.1. Drugs must be approved by FDA for treating salmonids. L.2. Discharge of any approved drug shall be in accordance with its intended use.	See discussion section B prior to comments, see Comments B.1 - B.7, B.9, B.12, B.16, B.18, B.19,B.20, B.21, B.24, B.30, B.36
J.2. Applications of antibiotics must apply with 21 CFR 529, 556, and 558.	L.1. Requires compliance with applicable FDA regulations for all approved drugs	21 CFR 529, 556, and 558 do not cover all applicable FDA regulations. Comment by FDA
J.3. Storage and handling in accordance with product labels.	Dropped from this section, and similar language added to Section M.	Became redundant with addition of Section M.
J.4. Drugs administered in accordance with product labels.	L.2. Drugs prescribed by licensed veterinarian in accordance with product label. Prohibits discharge in amounts, frequencies, or application methods if not evaluated and found to be acceptable by FDA or EPA.	See Comments B.1, B.3, B.4, B.5, B.6, B.7
J.4. Drugs applied by food must be pre-mixed by manufacturer or mixed off site by operator.	L.2. Drugs may be mixed into food by operator on site. Must report the discharge of any medicated feed beyond the confines of the net pens in amounts greater than 25 kg. (Section K.10)	See Comment B.32
No notification to EPA upon use of drugs for disease control	L.3. EPA and DEP are to be notified of drug use within 30 days along with details of actual application	See Comments B.1, B.3, B.4, B.5, B.6

2000 PN Draft Permit Section and Number	2002 Final Permit Section and Number	Reason for Change Referenced Comments
Section K. BMPs for Spill Control Plan to be submitted within 6 months Spill not quantified K.4. Spill reporting plan to be developed by permittee	**Now Section M.** BMPs for Petroleum and Hazardous Material Storage and Use Plan to be approved before petroleum products are stored at site. Spill is defined as any quantity lost Spill to be reported immediately to NRC, NPS, LEPC, NHMDO, and DEP	 See Comments B.11, B.29 See Comments B.11, B.29 See Comments B.11, B.29
Section L. Other BMPs 1. Report unusual events 2. Prohibit the discharge of sanitary wastes	**This Section Deleted** Included under K.10. Adds requirement to notify EPA and DEP of transmittable disease outbreak, and loss overboard of packaged or medicated feed. 2. Moved to Section B.	Moved conditions to other sections See Comment C.12
Section M. Reopener Clause	**Now Section P.** Reopener Clause	No change to contents
Section N. Monitoring & Reporting N.1. Submit all Part 1.A (Discharge Monitoring Report) data to DEP. Submit all non-Part 1.A to EPA. Monthly reporting to EPA for near pen water quality monitoring	**Now Section Q.** Monitoring and Reporting Q.1. Submit all data to EPA and DEP. Q.2. Includes reporting schedules for video surveys and benthic data	 EPA to review all monitoring data Clarification on reporting requirements
Additions to the final permit which have not already been noted.	**Section N.** BMP for Light, Noise and Debris Control [not a permit condition] **Section Q.** Quality Assurance for Environmental Monitoring and Containment Systems	Based on comments from Acadia National Park. See Comment F.2 See Comment E.13

III. RESPONSE TO COMMENTS

Written and oral comments received during the public comment period September 24 - November 24, 2000 have been divided under six major sections. In cases where a comment applies to multiple sections, the comment is either divided and addressed individually, or left together under the most applicable heading. Comments are highlighted in bold. Comments within each section are not listed in any particular order.

A. NUTRIENTS, WATER QUALITY, AND PHYSICAL CHARACTERISTICS OF BLUE HILL BAY

A.1. Comment: I hereby request that this [a 500,000 fish limit at both sites combined] be changed to a maximum annual stocking level of 300,000 smolts, i.e., 300,000 in 2001 for Acadia's Dunham Cove site, and 300,000 for Trumpets Hardwood Island site in 2002, and to consider incremental increases based upon demonstrated results of monitoring and nutrient studies conducted by Maine DEP/DMR.

A FCR (feed conversion ratio) analysis for Trumpet Island Salmon has shown that FCR's of 1.8-2.1 for the Hardwood Island Facility existed for a number of years. These FCR's are consistent with what much of the industry in general in North America was obtaining. With the advent of better understanding of feeding strategies and feeding monitoring and controls, FCR's approaching 1:1 are now being obtained with state-of-the-art equipment and personnel training. Acadia's investment in new state-of-the-art containment and feeding infrastructure is substantial, and reasonable increases in production are required to justify this investment. However, as the following table demonstrates, improved FCR's will reduce the excess nutrients to or below historical levels. (Table not included here). ***E. Swanson - Acadia Aquaculture, Inc***

Comment: Attached is a spread sheet showing a comparison of excess feed for four lots of fish at declining FCR's. The FCR's shown are typical for the industry in recent years and examples A and B (Tables not included here) are based on results I have achieved at my site. As you can see, even though the fish numbers go up, excess feed goes dramatically down.

Fish stocking numbers are generally determined on a farm based on output goals plus mortality. For example, with a harvest goal of 30,000 fish per cage, an additional 12% is added to the stocking number to allow for 12% mortality. In addition, there are harvest considerations in the spring. With harvesting taking place in May and June to finish the oldest year class, it would create great economic problems if my new year class stocking had to be reduced by 100,000 fish because of held over market fish that would be gone in 30 days.

Allowing a total input of 300,000 in the spring on the receiving site is very clear. That along with tracking achieved FCR and survival numbers, and John Sowles' nutrient study, will guide future possible expansions or retractions. 300,000 fish per year is an economically sustainable number, 400,000 more profitable - it takes the exact same crew and facility to operate either level. My opinion on my ability to operate and manage this farm is based on my understanding of the nutrient studies in Maine, Canada, and other countries, and I believe it will prove reasonable for the conditions in Blue Hill Bay.
E. Swanson - Acadia Aquaculture, Inc.

Response: A premise in developing the draft permit was that the Dunham's Cove site was to provide the permittee the opportunity to separate year classes in order to improve fish husbandry, and allow fallowing of the seafloor at the Hardwood Island site. There was to be no increase in nutrients discharged from the permittee's facilities until nutrient levels in Blue Hill Bay could be quantified and flushing rates assessed. EPA acknowledges that the approach presented in the draft permit intended to limit nutrient discharge through stocking limitations is crude, and

may not adequately address the potential to exceed historical nutrient input, however, EPA does not feel confident that nutrient levels will remain at or below historic maximum levels using the approach proposed in this comment despite the best intentions and efforts of the permittee to do so. Alternatively, EPA has determined that regulating the actual discharge of nutrients in the form of fish feed and metabolic waste is more appropriate for an NPDES permit in Blue Hill Bay. Therefore, with historical feed records provided by the applicant's feed provider, a maximum annual discharge of feed has been included which represents the maximum amount of feed used in a 12 month period (1998 - 2000). This will provide a better sense of actual nutrient input into Blue Hill Bay, and greater assurance that nutrient levels from salmon culture will not exceed historical maximums in the bay until such time that sufficient data has been collected to determine if an increase in nutrient input will be protective of water quality standards. This approach also allows the permittee to take advantage of more efficient feeding techniques to raise more fish provided that historic feeding levels are not exceeded.

A.2. Comment: A significant pool of dissolved nitrogen might be in the dissolved organic fraction. Dissolved organic nitrogen (DON) should be considered in any monitoring plan. Such measurements are required in order to determine possibly elevated urea (from the salmon) and other pools that might require converting the dissolved inorganic nitrogen to DON. ***D. Townsend - U. Maine***

Comment: In addition to those pollutants listed, Acadia should be required to monitor for either dissolved organic nitrogen or Kjeldahl nitrogen (total nitrogen plus ammonia), which is more likely the type of nitrogen generated by the farms. ***National Environmental Law Center (NELC)***

Response: EPA agrees that additional nitrogen data in the form of total organic nitrogen and total nitrogen would benefit the understanding of available nutrients in the bay associated with salmon culture, as well as provide consistency with Maine Department of Marine Resources's (DMR) ongoing nutrient study of Blue Hill Bay, and the permit has been modified accordingly.

A.3. Comment: Monitoring locations need be to described more precisely than "upstream" or "downstream" of the cages, to ensure that complex or changeable currents are accounted for. ***NELC***

Comment: It is necessary to define "upcurrent" and "downcurrent" where appearing. ***R. Slaven***

Response: The terms included in the draft permit are "upcurrent" and "downcurrent," and they were used intentionally to accommodate the varying current direction and movement of the pen system. EPA considers this flexibility necessary to ensure that samples taken serve their intended purpose, and the terms remain in the final permit. A position at each sample location shall be established using a global positioning system.

A.4. Comment: The impact of conventional pollutants, such as fish wastes and excess feed, on water quality and the benthic environment: A comprehensive monitoring regime for these pollutants and their potential impacts needs to be put in place. ***NELC***

Comment: Given that the operator is responsible for conducting the monitoring, we believe the permit must provide details about which parameters are required to be measured, what sampling and analytical techniques must be used, how data are to be analyzed, and the required schedule for reporting results. ***Acadia National Park***

Response: EPA agrees that water quality and benthic monitoring are integral to ensuring long term, sustainable salmon culture will not adversely affect the aquatic environment. Accordingly, the monitoring requirements have been expanded in the final permit to ensure impacts to the receiving waters and benthic environment associated with the facility's operation are identified. Also, the final permit includes specific sampling, analyses, and reporting requirements. Further, numeric limits to benthic impacts have been established in this permit so EPA can identify

when State water quality standards are likely to be exceeded, and in some cases triggering permit violations and compulsory remedial actions by the facility.

A.5. Comment: A further, serious concern with implications for human health is that of nitrogenous nutrient loading to Blue Hill Bay from this facility. The potential risks for adverse impacts to marine life and human health associated with inadvertent fertilization of toxic species such as pseudo-Nitzchia spp. have been documented in Canada, where human brain damage and deaths occurred from eating shellfish infected with pseudo-Nitzchia; in Scotland, where 8,000 miles of scallop beds were closed because of pseudo-Nitzchia-related amnesic shellfish poisoning (ASP); and on the California coast, where over 400 California sea lions died of domoic acid poisoning after consuming ASP-infected shellfish and schooling fish. In Monterey Bay, a bay-wide system of buoys have been deployed to detect the trace amounts of domoic acid in the water column that can cause ASP and threaten human health. There is no comparable system in place in Blue Hill Bay, despite the fact that DSP (diarrhetic shellfish poisoning) was detected in shellfish from the adjacent Frenchman's Bay in a coast-wide phytoplankton survey conducted by the state in summer 2000. The question of how Blue Hill Bay can successfully cope with nutrient loading from this pen site over a ten-year period is not adequately addressed by animal husbandry methods, particularly in view of the over-estimation of the maximum stocking level for fish at sites in the Bay. In view of the magnitude of potential human health impacts of excess nutrients and toxic algal blooms (especially pseudo-Nitzchia) in Blue Hill Bay waters, it is recommended that the applicant monitor and report to the EPA not only nutrient loading (nitrogen inputs and ratios), but also be required to monitor domoic acid levels in waters around the proposed facility. ***S. Shaw - Marine Environmental Research Institute (MERI)***

Response: It has not yet been determined if available nutrients currently limit plankton growth in Blue Hill Bay, and there will be no additional nutrients discharged from this facility as compared to historic levels associated with the existing facility at Hardwood Island. While it is unlikely that the discharge of nutrients from the Dunhams Cove and Hardwood Island sites will cause a bloom of noxious algae such as *Pseudonitzchia*, given permit restrictions on the amount of feed that can be discharged, EPA agrees that monitoring for the presence of noxious algae and shifts in dominant taxa is appropriate while additional data on nutrient levels in the bays are being collected. Therefore, the final permit includes seasonal monitoring for four target species of algae *Alexandrium tamarense*, *Dinophysis* spp., *Prorocentrum* spp., and *Pseudonitzschia* spp., as well as measuring chlorophyll *a*, Phaeophytin, and water transparency. EPA concluded that monitoring phytoplankton presence and abundance would provide more information on changes in species composition than would sampling for domoic acid levels. Following completion of Maine DMR's nutrient studies and flushing analyses, EPA will review the need for changes to the existing monitoring and nutrient limits. Any proposed changes would be subject to public review and comment.

A.6. Comment: A comprehensive study of the Bay (conducted by Dr. Neil Pettigrew) indicated that factors such as low DO levels and weak current velocity limited the ability of the site to sustain farm discharges without compromising water quality. Given the limitations of the state agencies outlined above (DMR and DEP,) it is not clear that water quality will be protected under the CWA by existing state mechanisms for data collection, analysis, and timely reporting. ***S. Shaw - MERI***

Response: This permit is being issued by EPA and does not rely on existing state mechanisms. The monitoring, analysis, and reporting requirements, as well as the numeric and narrative limits contained in the final permit are in many ways more extensive and more stringent than existing state and federal permit requirements in order to ensure consistency with the goals of the CWA and state water quality standards in regulating this discharge.

A.7 Comment: Flushing rates and dissolved oxygen levels are of primary concern when analyzing the potential negative impact that a finfish aquaculture site of this size will have on the bay's ecology. According to DMR Site Review 98-23, current velocities at this site are considered very low relative to other existing salmon net pen sites in the State of Maine. ***Friends of Blue Hill Bay***

Comment: If there are still questions about nutrient loads and the assimilative capacity of receiving waters around salmon aquaculture sites then the EPA should be analyzing data collected from the sites already existing in Maine. ***K. Benedict***

Comment: The location within the bay of the site under consideration, its episodic low oxygen condition, and the low tidal and mean current speeds observed in past studies, suggest that the flushing time at this site will be significantly longer than at other existing sites within the Gulf of Maine
N. Pettigrew - Maine Oceanographic Services

Response: Clearly, the combination of Blue Hill Bay's bathymetry and tidal range results in a flushing rate that is substantially lower than that found in Cobscook Bay, which has twice the tidal range. However, the effect of additional nutrients on the bay's ecology may be positive, negative, or negligible, depending on the bay's capacity to assimilate additional nutrients and the amount of nutrients introduced. Since the bay's assimilative capacity is at present not well understood, the draft permit included limitations on the number of fish allowed to be stocked so that the maximum historical stocking level at the permittee's Hardwood Island site would not be exceeded at both sites combined until the bay's present nutrient levels are better quantified. The final permit has dropped the limit on the number of fish, and instead limits the amount of nutrients introduced by the amount of feed discharged. EPA considers this a more accurate and appropriate approach for regulating nutrient input in a discharge permit.

A.8. Comment: A Preliminary Report on the Physical Oceanography of Dunham Cove Site, Blue Hill Bay, found that DO saturation levels in the site area during the summer of 1999 were at or below the allowable levels of Class SB waters (85%). The Maine Department of Environmental Protection has expressed concerns over this and the challenges of low DO levels in this area. In light of the aforementioned concerns [including comment A.7] we feel this particular location is inappropriate for net pen aquaculture and an NPDES permit should not be issued. ***Friends of Blue Hill Bay***

Response: Ambient DO saturation levels at or below 85% warrants the close monitoring of any activity that may further depress DO levels in the water column, but while this numeric limit is an enforceable state water quality standard, DO saturation alone is not a good indicator of compromised water quality. EPA is more concerned with low DO concentrations as an indicator of stressed conditions, particularly within and directly above the substrate. EPA recently developed ambient water quality criteria for DO (saltwater) for the area between Cape Cod and Cape Hatteras, also known as the Virginia Province. While this criteria was not developed specifically for Blue Hill Bay, it provides a good approximation of numeric limits that would be protective in Blue Hill Bay since several of the species used in the development of the criteria are likely residents in Blue Hill Bay, including American lobster, winter flounder, Atlantic rock crab, *Ampeliscid* amphipod, *Crangon* sand shrimp, and mysid shrimp. EPA will be monitoring DO concentration values reported at the site and comparing them with the numeric criteria established by EPA for those test organisms likely to reside in Blue Hill Bay. In addition, in certifying this permit, DEP has included a permit requirement that DO concentration levels never fall below 6.0 mg/l within the mixing zone.

Vertical stratification of the water column like that observed during sampling in 1999 may further inhibit mixing of oxygen rich surface waters with bottom waters. Accordingly, EPA has focused on the benthic environment as being the most vulnerable to the impacts associated with organic loading and associated hypoxic conditions that may occur. EPA agrees that this site may be prone to benthic impacts if organic loading surpasses the capability of bioturbation, as well as physical and chemical processes, from assimilating the waste and maintaining sufficient DO levels. EPA believes that the monitoring plan will detect benthic impacts, and that the numeric thresholds established in the final permit will ensure that timely mitigative responses by the permittee will occur if impact levels are exceeded. Further, it is EPA's opinion that full compliance with the terms of this final permit will provide the needed protection of the marine environment, as required under the Clean Water Act, and as such, the permit may be issued.

A.9. Comment: Knowing that the physical, chemical, and biological dynamics of Blue Hill Bay are complex and not yet fully studied or understood, it is our contention that before any further finfish aquaculture activity is expanded into the bay that a comprehensive oceanographic study be planned and implemented. This study should incorporate at least one complete year of data if not several years. Baseline data for flushing rates, DO, and nitrogen could then be established.

While the monitoring appears comprehensive we have several basic concerns: Without an adequate baseline study and an understanding of the ambient conditions in the bay, it appears it may be difficult to interpret the data and to make appropriate adjustments to the operation of a finfish aquaculture site in the bay. Again, we would like to see a comprehensive baseline study done first. ***Friends of Blue Hill Bay***

Comment: It is my professional opinion that an observational and numerical study aimed at establishing estimates of the summer-season flushing, or residence time, of waters in Blue Hill Bay, and the bay system's capacity to withstand additional organic loading, should be commissioned before any permit is issued. Such a study would help delineate areas within the bay that are most and least suited to net pen aquaculture. Without this information, the influence of nutrient enrichments, oxygen depletion, and toxic contamination from the proposed sites cannot be reliably predicted. If this permit is granted prior to, or without, knowledge of the flushing rates, it is imperative to include in the permit, monitoring requirements that clearly assess negative impacts of organic loading on the bay as a whole. ***N. Pettigrew - MOS***

Comment: The applicant of this [proposed] facility has publicly stated that he intends to seek permits for two additional aquaculture operations near Long Island. We are therefore concerned about the potential cumulative organic enrichment to Blue Hill Bay from discharges of numerous new aquaculture facilities and the possible impairment to National Park Service land interests. ***National Park Service - Acadia National Park***

Response: EPA agrees that before the discharge of additional nutrients into Blue Hill Bay are permitted from salmon farming, or any other point-source discharge that requires an NPDES permit, a more thorough study of the bay's nutrient levels and flushing rates is required. However, this permit does not authorize the discharge of additional nutrients into the bay. Instead, it ensures that the loading from this site do not exceed, in combination with the loadings from the Hardwood Island site, the historic high nutrient input from the Hardwood Island site.

Nutrient monitoring identified in the draft permit was modified in the final permit in order to collect additional information that will support current nutrient studies being conducted by Maine DMR. Nutrient monitoring, including sampling for phytoplankton, will be conducted from June through September at five locations: one each at approximately 100 meters north and south of the site, one within Dunhams Cove, one approximately 1,200 meters east of the site, and one located west of Long Island.

The baseline benthic infauna and sediment data was collected consistent with standards and procedures established in 1992 by Maine DMR, with input from Maine Department of Environmental Protection (DEP), National Marine Fisheries Service (NMFS), US Fish and Wildlife Service (USFWS), US Army Corps of Engineers (Corps), and EPA. The final permit was modified from the draft to include the establishment of two benthic reference sites. These sites will allow comparisons of the conditions on the seafloor in proximity to the pen system with those in similar areas that are beyond the influence of the facility. EPA believes the monitoring plan contained in the final permit is designed to effectively capture changes to the surrounding environment associated with the discharge from the facility before they reach unacceptable levels.

A.10. Comment: We need to be assured that the data collected is accurate and that the process of data collection is consistent with current scientific standards. We would like to see strict guidelines followed for the methodology of data collection and would like to see a group of independent scientists agree on the appropriate methodology for these specific data collection requirements. ***Friends of Blue Hill Bay***

Response: EPA agrees that sampling and data analysis should be consistent with methods accepted and used by the scientific community. The final permit includes more specific requirements and guidance for following sampling and analytical methods either developed by EPA, or meeting EPA's approval. Where appropriate, the permit provides some flexibility in how samples are collected, given site-specific considerations and the availability of multiple sampling and/or analytical approaches that are considered acceptable to EPA.

EPA did not feel it necessary to convene a group of scientists for the purpose of establishing appropriate methodology for the data collection requirements for this permit, however, in addition to revising monitoring requirements based on comments provided during the comment period, EPA utilized in-house benthic ecologists, biologists, and chemists to review current practices used at EPA and the State of Maine, as well as research methods described in some of the most current scientific literature on environmental impacts associated with salmon culture. Additionally, EPA coordinated with NMFS, USFWS, Food and Drug Administration (FDA), Maine DEP and DMR, and others involved in environmental monitoring to ensure methods included in the final permit are acceptable for their intended purpose.

A.11. Comment: Water quality monitoring data, along with other information about Maine's coastal waters and streams and their designated uses, also need to be used to establish water quality standards, effluent limitations for conventional pollutants, and limits on the numbers of fish farm and aquaculture sites that can be supported by each bay and by the entire Maine coast. ***NELC***

Response: Coastal water quality monitoring, the development of water quality standards, and waste load allocations for aquaculture facilities in Maine embayments are all important issues, but are beyond the scope of a permit developed for a single facility. EPA recognizes that nutrient loading to the Blue Hill Bay associated with the discharge of fish excretions and feed needs to be limited and monitored until the nutrient capacity of the Blue Hill Bay is better quantified. All other sources of nutrient loading, including waste water treatment facilities and non-point sources, need to be identified and factored into the overall nutrient budget.

A.12. Comment: The upcurrent measurements described in the text will be contaminated by the generally north/south tidal oscillations of the contaminated plume generated by the net pens and thus bias the measurements towards reduced impact. It is strongly recommended that the upstream monitoring be replaced by monitoring at a site displaced laterally from the net pen site. Monitoring should be done 100 meters east and west of the pens, to avoid either a high or low bias. If only one measurement is to be taken it should be on the eastern side to avoid the low oxygen plume that was observed nearshore of Long Island in August, 1999. ***N. Pettigrew - Maine Oceanographic Services***

Response: While it appears unlikely that depressed DO levels associated with the net pens would persist as an identifiable plume hours after discharge, relocating the upcurrent sampling site to 100 meters east further reduces the potential for re-entrainment if such a plume exists, and does not increase the cost or complexity of monitoring. Accordingly, this change is reflected in the final permit.

A.13. Comment: Background monitoring should be conducted June through September, rather than July through September as now listed. ***N. Pettigrew - Maine Oceanographic Services***

Response: EPA agrees since water column stratification can begin in June, and has changed the permit accordingly.

A.14. Comment: The background monitoring site should be 1/4 mile east of the lease site rather than 1/4 mile north. This position will be out of the direct tidal excursion of the pen "discharge cloud".
N. Pettigrew - Maine Oceanographic Services

Response: To avoid possible influence from the facility's discharge plume, the final permit requires farfield sample

sites to be located at least one nautical mile away from the facility, with one being located to the east.

A.15. Comment: Calculations by John Sowles, Maine DMR, indicate that the proposed salmon farm would contribute approximately 90,000 kg/year of nitrogen to the bay. This figure is roughly 36 times the nitrogen impact of the Blue Hill sewage treatment plant, and approximately three times as much as the Ellsworth sewage plant. It seems likely that this much "fertilizer" would significantly stimulate algal production and alter the natural system's of nutrient ratios of nitrogen to silicate and phosphorus. Changes of these ratios can cause shifts in the species composition of phytoplankton, and often a cause of succession from diatom blooms to dinoflagellate blooms; including the Gulf of Maine red tide organism, *Alexandrium*.
N. Pettigrew - Maine Oceanographic Services

Response: The permit prohibits any increase in nutrient loading into Blue Hill Bay above historic levels introduced at the permittee's Hardwood Island site. The final permit includes monitoring of noxious and dominant phytoplankton taxa that coincides with nutrient monitoring from June through the end of September. EPA believes that the discharge limits combined with monitoring requirements will both minimize the potential, and identify the presence, of noxious algal blooms.

A.16. Comment: The draft tables (pg 2-5) imply that DO is to be measured daily, but the narrative states that it must be measured every two weeks, from July 1 - September 30. Recommend starting sampling period June 1, and sampling weekly. ***N. Pettigrew - Maine Oceanographic Services***

Comment: We suggest that DO monitoring be reduced to weekly. ***Maine DMR***

Response: EPA acknowledges the conflictive sampling requirements presented in the draft permit. Based on these comments and discussions with Maine DEP, the final permit now requires monitoring for DO (concentration and saturation), salinity, transparency, temperature, and depth once per week, June 1 through September 30.

A.17. Comment: Because of the nature of the measurement method, the calibration of membrane electrode instruments for measuring dissolved oxygen are changed by the measurement itself. In addition, the calibration can change significantly due to the introduction of small impurities (sediment, bubbles, etc.). Thus it is important to calibrate using the Winkler Titration method more often than seasonally. Last year with a new instrument we found significant calibration changes between two successive surveys; on the order of 5% in units of saturation. Thus the calibration should be done at least monthly, and preferably between each of the survey cruises. ***N. Pettigrew - Maine Oceanographic Services***

Response: EPA is not specifying a specific brand of DO probe, so the permit language has been changed to require that initial calibration, recalibration, and preventive maintenance procedures follow manufacturer's recommendations exactly. However, if the manufacturer does not specify recalibration requirements, the final permit requires calibration at a minimum frequency of once per month during the sampling season.

A.18. Comment: I believe that this category (undesirable or nuisance species) should include consideration of planktonic species, such as the red tide dinoflagellate, for example. I could find no concomitant section in the permit that describes the monitoring of any micro-organisms, however; only macro-organisms such as those that can be studied using scuba divers or an underwater video camera were mentioned. I believe monitoring the plankton is important given the potential for unusual nutrient effects on the system.
D. Townsend - U. Maine

Response: EPA agrees with this comment and has included the monitoring of phytoplankton, chlorophyll *a*, phaeophytin, and water transparency in the final permit.

A.19. Comment: I don't believe, given the complicated morphometry of Blue Hill Bay, that enough sampling stations are included in the plan. Planktonic ecosystem responses need to be given careful consideration. *D. Townsend - U. Maine*

Response: The sampling stations in the draft permit were intended to focus on site-specific impacts. Based on this comment and others, the sampling required in the final permit covers a more broad area of the bay. In addition, the sampling plan has been modified in the final permit to support Maine DMR's ongoing bay-wide nutrient study.

A.20. Comment: I believe that it is important to include silicate to the list of dissolved inorganic nutrients to be monitored in Blue Hill Bay. It is well known that ratios of the various inorganic nutrients (N, P, Si) are important in controlling species composition of the plankton, including possibly harmful microalgal species such as *Alexandrium* sp. and *Pseudonitschia* sp.. *D. Townsend - U. Maine*

Response: EPA agrees with this recommendation for the reasons stated, and has included dissolved silicates in the nutrient monitoring plan.

A.21. Comment: The suggestion that thorough circulation and nutrient modeling be carried out prior to any further consideration of this proposal seems totally unnecessary. To date, despite extensive monitoring and study, there is no existing evidence of catastrophic or system-wide impacts in Maine or anywhere else. Should such an impact occur that could be attributed to the salmon operations, the regulatory agencies have within their authority the option of simply requiring rapid modification/curtailment or outright cessation of operations. *C. Heinig - MER Assessment Corp.*

Response: While algal blooms have been reported in close proximity to various aquaculture facilities throughout the world, EPA-New England is not aware of any studies that have established a clear relationship between a bloom and an aquaculture facility. Nevertheless, the collective discharge from the permittee's two facilities will represent the largest point-source discharge of nutrients into the bay. EPA has concluded that while this facility may be authorized to discharge into Blue Hill Bay in the absence of bay wide nutrient and flushing data, there will be no discharge of nutrients in excess of historic levels permitted until the bay's capacities and limitations are better understood.

Before a regulatory agency can take action against a permitted discharger the exceedence of an established numeric threshold, or other clear violation of permit conditions, is normally required. With the conditions of this permit in place, there will be a mechanism for monitoring the water column and substrate. In addition, there will be established numeric impact thresholds designed to flag deteriorating benthic conditions, and identify unacceptable impacts (i.e. permit violations) which require an immediate mitigative response.

A.22. Comment: I concur with the need to monitor nutrient contributions by the proposed salmon operation, if only to document actual contributions by this source should problems arise in the future. However, monitoring by Acadia Aquaculture should only be conducted in the context of a larger monitoring effort to determine nutrient flux within the bay. Similar monitoring should be required of other major sources of nutrient inputs to the bay, e.g. the Blue Hill and Ellsworth sewage treatment facilities, not to mention other important non-point source contributions, to allow determination of their respective contributions. Reference stations should be located around the bay to determine and document if and how these contributions are affecting Blue Hill Bay. To require nutrient monitoring by Acadia Aquaculture without the development of supplemental information from these other sources and reference stations would render the Acadia Aquaculture data essentially meaningless. If nutrients remain a serious concern, then I would urge EPA to work closely with the State of Maine agencies to develop a sensible, comprehensive monitoring plan for the bay. *C. Heinig - MER Assessment Corp.*

Response: EPA agrees that accurately quantifying nutrient input into Blue Hill Bay requires an assessment of all

sources of point and non-point nutrient loading. Nutrient monitoring in the final permit closely resembles Maine DMR's larger monitoring effort in Blue Hill Bay. While the complete nutrient budget of the bay will not be fully understood without all nutrient sources identified and quantified, EPA believes Acadia's monitoring effort will yield meaningful information since it contributes to a better understanding of the bay's current nutrient levels.

If nutrient levels appear to limit phytoplankton production, based on the state's bay-wide monitoring results, or other relevant data, then EPA would likely recommend to the state that waste load allocations be developed for all contributing point-source discharges that currently exist.

A.23. Comment: Scientific studies confirm anecdotal evidence that the current velocities measured at the proposed site will not provide needed flushing to ensure the receiving waters can dissipate the pollution discharge. Maximum currents velocities at the site were reported to be about 20 cm/second, which according to Maine DMR is less than half of the 40 - 60 cm/second velocities at other sites in Maine. Local fishermen believe that countercurrents and low velocities in that area minimize flushing. According to Dr. Pettigrew, it would take about 100 times longer to turn over the volume of water in Blue Hill Bay compared to other farm sites in Maine. Maximum and median current velocities are greater during the flood (northerly flow) tide, resulting in a net flow northward of nutrients towards shallower waters and populated areas.
R. Slaven - Wood Point

Response: While a slower flushing rate in Blue Hill Bay, as compared to existing sites Downeast, does not necessarily mean that conditions are unacceptable for salmon farming at some level, it is a serious concern which has prompted EPA to limit nutrient input from this salmon farm into Blue Hill Bay until sufficient nutrient sampling and flushing studies can be conducted to determine the bay's current nutrient budget, and its capacity to assimilate additional nutrients.

A.24. Comment: Given the serious potential navigation and marine mammal entanglement hazards associated with nets, we recommend that the permittee be required to inform appropriate federal and state agencies immediately if nets are lost and not recoverable. ***Acadia National Park***

Response: The final permit now requires nets to be tagged; requires lost nets to be reported within 24 hours; and requires such nets to be recovered within 30 days from the date lost. This requirement is intended primarily to minimize adverse effects to the benthic community that could result from allowing lost nets to remain in place on the ocean floor, however, entanglement hazards to other marine organisms, as well as mobile fishing gear, are other valid concerns.

A.25. Comment: Monitoring Systems must always include a mechanism for early warning and response.
V. Newman - Sierra Club

Response: EPA agrees that early detection and response is vital to minimizing environmental impacts, and the draft permit has been changed to reflect this opinion. The final permit includes monitoring designed to detect subtle changes in benthic conditions, phytoplankton community structure, and water quality and nutrient parameters. In addition, it requires the development of a spill response plan for petroleum products and other hazardous materials, the monitoring of drug discharges, regular monitoring of the stocked fish inventory and reporting requirements for any known or suspected escaped fish.

A.26. Comment: Aquaculture operations in Blue Hill Bay and along the entire Maine coast should be limited so as to ensure that designated uses of Maine's coastal waters and rivers can be supported. We are not aware of any studies demonstrating that Blue Hill Bay is capable of supporting the growing of 500,000 fish.
NELC - U.S. PIRG

Response: EPA's review of this and similar comments prompted a re-evaluation of the draft permit approach to limiting nutrients. Since the discharge of feed is the source of nutrient input, either directly from unconsumed feed or indirectly through fish waste excretion, EPA decided that limiting the amount of feed discharged to the maximum used over a 12 month period within the past three years (1998-2000) would ensure that increases in nutrients would not occur until such time as new information on nutrient levels in the bay are collected and studies on the bay's ability to assimilate nutrients are completed.

A.27. Comment: Mr. Pettigrew's map does not accurately plot the data points, at least 43, 44, and 45 which are reported to be on my site. A more accurate direction to follow the flow would take it through station 9 to the north, and station 7 to the south, shown on Fig 5. You will note that the oxygen profile at depth on station 9, marked in red, is in the 85-90% range. Super saturation occurs within most of the range where the fish are. If the oxygen profile is correctly aligned with the direction of flow, oxygen levels are significantly different, much higher, upstream and downstream from the site. With 12 meter nets and the correct profile, O2 does not fall below 90% above the bottom of the nets, and is in the 85% range at the bottom.
E. Swanson - Acadia Aquaculture

Response: While stations 43, 44, and 45 appear to be plotted inaccurately on Figure 4 of Dr. Pettigrew's study, Physical Oceanographic Studies of Blue Hill Bay, Summer 1999, the raw data sheets for these stations included in the report provide positions that, when plotted on a nautical chart and connected, form a line which runs through the center of the lease site in a north-south orientation. The center of the lease site is 44°20'07.8"N, 68°28'46.5"W, according to Acadia's lease site application. Station 44 is located at 44°20'06"N, 68°28'48"W, which is approximately 200 feet southwest of the center point of the lease site.

A.28. Comment: I know for a fact, though never proved, that this spring, a lobster pound near Addision, Maine lost a large number of lobsters, in excess of 10,000 pounds, shortly after a nearby salmon pen cleaned its nets with the use of a pressure washer. ***R. Bauer***

Comment: Is net cleaning for marine fouling included in this criteria (Narrative Limitations). Suggest this section is too all-inclusive to be fair and would prohibit salmon culture if the criteria were judged at the extreme. Suggest "shall not" be replaced with language that reflects the potential for minimal and/or transient discharge. ***J. Pitts - Bellwether Consulting, Inc.***

Response: Pressure washing nets can discharge large quantities of fouling organisms, as well as chemical antifoulants impregnated on the nets. EPA believes this intermittent discharge could cause excessive and unacceptable levels of turbidity in the water column beyond the mixing zone, and increase organic loading to the substrate. Accordingly, pressure washing nets on-site is prohibited in the final permit. It should be noted that the permittee had no intention of pressure washing nets at this facility. Fouled nets will be removed and shipped to Canada for land-based cleaning and storage.

A.29. Comments: We disagree with requiring DO levels above standards. To require anything above Maine's standard (85%) does not serve any useful purpose, nor is required of any other discharger.
Maine DMR, C. Heinig - MER Assessment Corp.

Response: EPA agrees with these comments. The final permit requires a minimum DO concentration of 6.0 mg/l within the mixing zone (i.e. within the net pens and out to 5 meters,) and at least 85% DO saturation beyond the mixing zone.

A.30. Comment: Recommend temperature data be recorded in degrees centigrade instead of, or in addition to, Fahrenheit. ***C. Heinig - MER Assessment Corp.***

Response: EPA agrees with this comment. The final permit requires reporting temperature data in degrees centigrade.

A.31. Comment: Maine DEP is currently reviewing and possibly revising the DO standards. It would be appropriate to add wording that automatically modifies the permit to reflect changes if they occur during the permit period rather than waiting for a renewal. ***Maine DMR, C. Heinig - MER Assessment Corp.***

Response: A change to the DO saturation limit can be made prior to permit re-issuance based on the state's revision of existing standards, however, any change to the DO limit in this permit would not be automatic, but instead require a permit modification which provides in advance an opportunity for public review and comment.

A.32. Comment: We support nutrient analyses at levels you recommend. ***Maine DMR***

Response: Nutrient monitoring has changed considerably in the final permit in order to better quantify nutrients levels in Blue Hill Bay, and monitor for changes in phytoplankton species composition and abundance. Changes to the monitoring requirements reflected coordination with Maine DEP and DMR.

A.33. Comment: Given the concern over Blue Hill Bay, we request that as other permits to discharge to Blue Hill Bay are renewed or written, similar requirements regarding ZIDs, toxicity testing, benthic impacts, and monitoring be written into the permits. Additionally, we must look at unregulated sources such as boating, urban, residential, and rural runoff, atmospheric deposition, and others. ***Maine DMR***

Response: Existing dischargers, other than Trumpet Island Salmon Farm, already have numeric limits for pollutants such biochemical oxygen demand, total suspended solids, pH, chlorine, and fecal coliform bacteria, as well as narrative limits prohibiting the presence of a visible oil sheen, foam, floating solids, turbidity or discoloration that would impair uses designated for the receiving water's classification. In addition, the effluent is prohibited from discharging materials in concentrations or combinations which are hazardous or toxic to aquatic life, or would impair designated uses of the receiving waters. EPA would support the development and use of biocriteria to assess attainment of water quality standards. State water quality standards prohibit any discharge, either by itself or in combination with other discharges, to lower water quality of the assigned classification of the water body, or the classification that it is attaining. Therefore, if nutrient studies conclude that Blue Hill Bay is nutrient-limited, or if the bay is found to be in non-attainment of its classification, then the Maine DEP may develop a total maximum daily load, which would include waste load allocations for point sources and load allocations for nonpoint sources. This plan would identify all point and non-point sources of nutrient loading to the bay, and provide target discharge limits for each source.

A.34. Comment: Several commentors questioned the accuracy of the stocking limit figure of 500,000, and suggested the historic maximum was as low as 120,000 fish. They also requested clarification on how each facility would be regulated to ensure compliance with this limit.
Sierra Club, Friends of Blue Hill Bay, S. Shaw - MERI

Response: EPA checked the accuracy of the maximum historic level by reviewing stocking records maintained by Maine DMR. The specific number for the period in which the most fish were stocked on site is between 400,000 and 500,000 fish. Had EPA decided to continue with the original approach of limiting the number of fish to historic levels, as proposed in the draft permit, the maximum stocking level would have been adjusted in the final permit to reflect the actual historic stocking maximum. However, EPA decided that limiting the discharge of feed to historic levels would be a more accurate and appropriate approach to regulating the input of nutrients into Blue Hill Bay since the discharge of feed is the source of nutrient input, either directly from unconsumed feed, or indirectly through fish waste excretion.

The final permit has removed any reference to a 500,000 fish limit. Instead, it includes an annual maximum limit of 2,151,000 pounds of feed to be discharged at both the Dunhams Cove and Hardwood Island sites combined. The annual limit represents the maximum feed used in a 12 month period based on three years of feed use (1998-2000,) and purchase records provided by the permittee's sole feed vendor. Compliance with this permit condition will be monitored by EPA through the review of monthly feed use data submitted by the permittee. This limit is intended to prevent the introduction of significant amounts of additional nutrients into Blue Hill Bay from salmon farming until there is a better understanding of what drives phytoplankton production in the bay, and how effectively the bay is able to assimilate additional nutrients. Following the completion of bay-wide nutrient monitoring and flushing studies, the permit may be modified to reflect new information, with the opportunity for public comment.

A.35. Comment: The location and size should take into account the specific currents and other water movement in this area, based on actual and up-to-date data. There appears to be some dispute regarding the direction of water flows. We request that EPA coordinate with appropriate agencies regarding details about associated infrastructure and marine traffic related to this facility. ***V. Newman - Sierra Club***

Response: A fairly substantial amount of ambient current data have already been collected for this site, by both proponents and opponents of this operation, as well as by the state. The existing data has allowed EPA to determine the facility's potential to exceed state water quality standards for dissolved oxygen, and to design a water column and benthic monitoring plan that reflects the specific conditions at the site. EPA has worked with state and federal agencies on all issues that are in any way relevant to regulating the discharge from this facility. In addition, the Army Corps of Engineers has addressed issues related to marine traffic through issuance of a Rivers and Harbors Act section 10 permit.

A.36. Comments: Several commentors requested that adequate baseline studies be conducted before operations begin in order to be able to assess impacts to the seafloor. Some suggested that a single sampling event is insufficient to properly characterize the area, and that outdated methods and equipment were used to collect the data. ***Friends of BHB, S. Shaw - MERI, N. Pettigrew - MOS***

Response: EPA considers the data collected in support of the Maine DMR leasing process acceptable for characterizing the benthic infaunal community, sediment type, and general nature of the seafloor at this lease site. The data was collected consistent with the standards and practices developed by the state for this purpose. Since the existing FAMP program does not utilize reference sites in assessing impacts from salmon farms to the seafloor, additional baseline data will be required to establish two reference sites. Also, additional sediment samples will be required both at the lease site and reference sites to quantify existing levels of copper and zinc.

A.37. Comment: I feel that with the good water depth and currents, there will be adequate dispersal of the particulate organic matter and sufficient oxygen supply for breakdown of the organic matter by benthic bioturbators. If there is adequate oxygen in bottom waters for aerobic breakdown of the organic matter under the salmon pens, which would be supplied by the over 20 cm per second currents through increased oxygen diffusion to the bottom waters, the microbial processes of coupled nitrification/denitrification results in the release of N2 gas into the atmosphere! My modeling experience, previous published studies, recent high quality current data from the bottom waters, and experience with the ICES (International Council on Exploration of the Seas) working group suggests that the [proposed] salmon farm is in a good site, and I support his application. ***C. Newell - Great Eastern Mussel Farms, Inc.***

Response: The comment supports EPA's opinion that salmon farming, at some level, may be sustainable at this site. However, it is unclear at what level of production (organic loading) the bioturbators will no longer able to assimilate all the organics introduced to the seafloor in this depositional area. Therefore, the final permit has included a comprehensive monitoring plan and established numeric impact thresholds to ensure that water quality standards are fully protected beyond the spatial limits of the sediment impact zone, which includes the protection of the most

pollution-sensitive infaunal organisms resident to the area.

A.38. Comment: Water sample profiles taken vertically within a mussel raft and horizontally upstream, inside, and downstream from a raft system in Blue Hill Bay at different stages of tide demonstrated the grazing of about 50% of the phytoplankton or particulate carbon and nitrogen as the water passes through the fully seeded raft. Therefore, not only will mussel rafts remove particulate organic matter which may be drifting away from the salmon cages, but also they graze the phytoplankton which might be stimulated from NH_3 excretion from the salmon. Estimates by my colleagues in the Netherlands (Dr. Aad Smaal) indicates that just 5% increase in mussel biomass will control a 100% increase in nitrogen. As we harvest the mussels in Blue Hill Bay (30-40 tons wet weight per raft per year,) we remove nitrogen from the system.
C. Newell - Great Eastern Mussel Farms, Inc.

Comment: I also request the mitigating effects of nutrient removal by mussel culture on my Hardwood Island site, and future sites, be considered in present and future production goals.
E. Swanson - Acadia Aquaculture

Response: Clearly the potential exists for reducing significant amounts of particulate organic matter to the bay from salmon farm operations through biofiltration with cultured mussels, however, the permittee did not include in his discharge permit application the culture of any organism besides Atlantic salmon. Therefore, the culture of mussels at the Dunhams Cove site is not authorized unless the permit is modified. Regarding the receipt of mitigation credit for presence of mussel rafts at the Hardwood Is. site, EPA is not prepared at this time to accept their presence as mitigation or, to offset increased nutrient loading from this facility since they are present only at the Hardwood Island site, and this permit cannot require their continued presence at that site. That said, EPA generally encourages the use of innovative and environmentally acceptable approaches to reducing the discharge of pollutants, and would consider a request by the permittee to increase the discharge of nutrients if it could be demonstrated to EPA's satisfaction that such an increase is offset entirely through the filtration of cultured bivalves, that the increase of organic loading to the seafloor does not cause a violation of permit limits, and that no other permit limit or condition would be violated. Any such change to nutrient limits would require a permit modification, which provides the public an opportunity for review and comment.

A.39. Comment: Regarding the section, "Effluent Limitations and Monitoring Requirements," the four tables are misleading and/or confusing with regard to minimum monitoring, frequency, and type of sample. The sample is uniformly listed as a "grab;" this term is usually reserved for benthic samples, and its meaning with regard to hydrographic variables such as the dissolved oxygen, temperature, and salinity is unclear.
N. Pettigrew - MOS

Response: EPA recognizes this concern with this section of the draft permit, and has made the necessary changes. The term "grab sample" is standard for NPDES discharge permits where samples of an effluent are literally grabbed from the waste stream prior to discharge. The final permit lists grab, probe, or other sampling devices, as appropriate. Detailed descriptions of sampling requirements are contained within Section F of the final permit.

A.40. Comment: When it blows from the south in Blue Hill Bay, it gets quite ugly. Much more exposed than most salmon farm sites in the Cobscook Bay area. A study of the wave heights should be done. Also, ice is a major problem in Blue Hill Bay; much more so than in Cobscook Bay. Just this winter, we had ice down to the southern tip of Long Island. Six years ago we had ice almost down to Naskeag Point. There is no piece of chain, rope, or granite that will forever last and keep a pen where it's supposed to be. There is no such thing as a fully functional marine containment system. ***R. Bauer***

Response: EPA agrees that it is currently impossible to be certain that the best net pen system will survive the worst conditions a Maine winter storm can subject it to. EPA was informed that the manufacturer of the net pen system the

permittee is planning to purchase would conduct an assessment of the physical conditions of the proposed site, and make mooring recommendations to the permittee. Also, the permittee is required to develop an integrated fish loss control plan, which among other things, requires the applicant to identify preventative maintenance, and storm preparedness measures for the net pen facility.

A.41. Comment: At the hearing, Dr. David Townsend reported that nutrient sampling in the Blue Hill Bay area revealed "clouds" of high ammonia concentrations within the area, although the exact locations of these clouds were not given. He stated they were discrete, and suggested they were not associated with either the applicant's Hardwood Is. site or Blue Hill's waste water treatment facility. The mere existence of elevated ammonia concentrations is interesting. Given the diffuse nature of the contributions of ammonia to the system from the proposed salmon operation, over both space and time, it is highly unlikely that such contributions would lead to the toxic levels of ammonia adjacent to the net pens, much less to the system as a whole. Since ammonia is the preferred form of nitrogen for uptake by algae, its presence in elevated concentrations within the bay, without any report of substantial algal blooms, seems to suggest that primary productivity in the bay is limited by factors other than nutrients. ***C. Heinig - MER Assessment Corp.***

Response: If additional sampling confirms elevated ammonia levels in the bay, EPA might suspect the bay is overloaded with nutrients, which may also be a cause for concern.

A.42. Comment: What is the basis for limitations at the "historical maximum"? Is there some evidence of degradation of the receiving water in Blue Hill Bay due to impacts of salmon farming? The limitation seems arbitrary and will not best serve the NPDES process at this site or additional sites requiring an NPDES permit. Suggest that arbitrary maximum stocking density be omitted, and instead, [EPA should] develop Performance Standards that the farm must meet through BMPs (Best Management Practices). Performance Standards will reward the farm for doing the best job possible while protecting the water body and fish being farmed. ***J. Pitts - Bellwether Consulting, Inc., M. Opitz - U. Maine***

Response: The draft permit placed a limit on the maximum number of fished allowed at the facility; it did not limit stocking density. Blue Hill Bay is far removed from most of the salmon farm industry which enjoys an extremely high tidal range, and the resulting tidal currents. Monitoring of ambient conditions in Blue Hill Bay have revealed summer periods of vertical stratification, and dissolved oxygen saturation levels that were below state standards. The limit on fish in the draft permit was intended to hold nutrient loading levels to the historical maximum at the permittee's existing farm until nutrient and flushing studies could better identify the bay's capacity to assimilate extra nutrients. While this limit was not arbitrary, it also did not adequately address nutrient loading. In the final permit, EPA decided instead to limit the discharge of feed to the permittee's historical annual maximum. This is intended to ensure that the discharge from this new facility will not cause or contribute to a violation of water quality standards. BMP's that focus on appropriate stocking densities and feed conversion ratios might be more appropriate once questions about the bay's nutrient carrying capacity are answered.

A.43. Comment: Sampling requirements for dissolved oxygen in the draft permit are sometimes redundant and unnecessary. I would recommend sampling at a distance of 100 meters be required only when sampling at 5 meters drops below 85% saturation. ***C. Heinig - MER Assessment Corp.***

Response: The final permit includes a revised DO sampling plan which requires the permittee to conduct DO sampling at 100 meters only if DO saturation at 5 meters downcurrent is below 85% saturation.

A.44. Comment: It is unclear what purpose water quality testing has when done only "downcurrent " from the site. It appears reasonable to test water quality "downcurrent" and "upcurrent" to evaluate any impact of an aquaculture site. ***M. Opitz - U. Maine***

Response: If DO saturation levels are above the state's numeric standard of 85% within the influence of the facility (i.e. 5 meters downcurrent,) then there is no need to conduct additional sampling. Only when DO levels are below 85% saturation or 6.0 mg/l would the permittee be required to collect additional samples upcurrent in order to determine if DO depression is related to the facility's discharge.

B. DISCHARGE OF DRUGS AND OTHER POTENTIALLY TOXIC POLLUTANTS

EPA received many comments concerning the discharge, restrictions, and monitoring of toxic materials associated with this facility. While the vast majority of the comments focused on the use of the drug cypermethrin, others included the use of antifouling nets, antibiotics, the prophylactic use of drugs, and the existing presence of toxic pollutants in the water column and sediments.

Comments related to cypermethrin, a drug developed to treat salmon for sea lice infestation, included concerns about impacts to non-target organisms, the ambiguities and expense of conducting dye studies, the choice of test species, the selection of toxicity testing methods, and the questionable utility of sediment toxicity testing. Many comments urged banning the use of cypermethrin in Blue Hill Bay. Following the close of the public comment period, EPA requested and received an environmental review conducted by the Food and Drug Administration (FDA) on the use of cypermethrin in salmon culture operations in Maine. FDA's review was based on information gathered to date through the Investigational New Animal Drug program (INAD.) Based on a review of FDA's report, EPA believes that the discharge of cypermethrin from this facility would likely violate state water quality standards by causing lethality to organisms passing through the mixing zone, and possibly cause lethal or sub lethal impacts to sensitive organisms beyond the mixing zone. According to the FDA, further studies are necessary in order to determine whether or not cypermethrin should be approved. Since the discharge of cypermethrin is prohibited, all conditions associated with its use have been removed from the final permit. Therefore, most comments specific to the discharge of cypermethrin will not be responded to individually.

B.1. Comment: I am very disturbed by the fact that there has been no testing of the waters (at the Hardwood Is. site) and that chemicals may be used without any governmental oversight. ***P. Felderman***

Response: The Corps of Engineers section 10 permit for the Hardwood Island facility requires that only drugs approved by FDA be used, and that prophylactic use of any drug is prohibited. EPA's permit is for the applicant's Dunham Cove site. It includes extensive water quality and benthic monitoring, and regulates all chemicals that may be discharged from the facility. All existing and future facilities, including the permittee's Hardwood Island site, will require a discharge permit from Maine Department of Environmental Protection (DEP).

B.2. Comment: EPA should determine what methods Acadia plans to use to stun their fish, determine whether any chemical use would result in a discharge of a pollutant, and place limitations on the unnecessary use of such chemicals or otherwise ensure that such chemical use will not create any adverse impact to human health or the environment. ***National Environmental Law Center***

Response: The permittee informed EPA that he has no intention of using a chemical to stun fish prior to harvesting, and the discharge of such a chemical which is not declared in the permit application or authorized by the permit would be a violation of the permit. It is EPA's understanding from discussions with the permittee that following removal from a net-pen, the salmon are subjected to extremely low water temperatures in a holding tank just prior to slaughter.

B.3. Comment: Fish farm permits should strictly limit the use of pesticides, drugs, antibiotics and other toxic chemicals (such as those used in antifoulants), and impose strict toxicity limits and other restrictions on those that are used. ***National Environmental Law Center***

Response: EPA believes the final permit applies the appropriate limits and monitoring requirements to ensure that the discharge of toxic pollutants will meet state water quality standards, including the following:

1. The discharge of drugs, including antibiotics, is limited to those approved by FDA for treatment of salmonids, and prophylactic use of these drugs is prohibited, except for specific situations which warrant such use. Any prophylactic use of drugs requires prior approval by EPA.
2. All use of drugs will be reported monthly to EPA and DEP
3. EPA reserves the right to require the permittee to monitor the discharge of FDA approved drugs if EPA suspects that the frequency, concentration, or method of application creates a reasonable potential to cause or contribute to a violation of state water quality standards;
4. The use of nets treated with antifoulants (usually an algicide or herbicide) is currently allowed since treatment occurs by the net manufacturer, however, follow-up treatment is prohibited;
5. Monitoring for the presence of copper in sediments is required if nets are impregnated with copper-based antifoulants;
6. Monitoring for the presence of zinc in sediments is required if feed contains zinc additives;
7. The discharge of biocides to clean nets and other gear on site is prohibited;
8. The use of materials containing tributyltin (TBT) compounds is prohibited.

B.4. Comment: Several comments suggested that therapeutics, such as antibiotics that are typically introduced via the feed, should be tracked more rigorously and that the impacts, including chronic effects, on the benthic community and fish should be closely monitored.

Response: EPA acknowledges the need to track the discharge of antibiotics and other drugs, and has included in the final permit a monthly reporting requirement for the facility to identify the type and amount of drugs used. Drugs approved by the FDA for treating fish are generally prescribed by a licensed veterinarian consistent with good animal husbandry practices. However, if the amount, frequency or type of drug being discharged raises concerns to EPA that there's a reasonable potential of causing or contributing to a violation of water quality standards, then additional monitoring, including toxicity testing and effluent limitations may be required to ensure standards are being protected. This permit prohibits the prophylactic use of drugs, except when approved by EPA for cases where early treatment is prudent for minimizing the transmission of disease between cultured stocks, and potentially to wild stocks.

B.5. Comment: Requirements of limited discharges of toxic materials by the facility into the mixing zone around the pen may not be adequate to prevent impacts on marine organisms. Given the "toxic soup" of multiple compounds already present in the mixing zone, it stands to reason that these compounds need to be identified and quantified in the food chain before making judgements about the impacts of a single toxic substance (medication) on benthic organisms or marine life. At the very least, a baseline study of persistent organic pollutants (POPs) should be conducted in Blue Hill Bay, to determine the levels of persistent contaminants present at different trophic levels (e.g. water, sediments, shellfish, fish, lobsters) prior to the introduction of medications or other chemicals associated with salmon farming.
S. Shaw - Marine Environmental Research Institute

Response: References to a defined toxic dilution zone have been deleted from the final permit since the discharge of drugs that cause lethality to passing organisms is a violation of the Clean Water Act, and prohibited. New dischargers are generally not required to identify existing toxic pollutants in the water column of receiving waters. It is the state's responsibility to monitor the health of any particular water body, and to determine if it is in attainment for the standards of its given classification.

B.6. Comment: A further recommendation, in view of the bioaccumulative, lipophilic nature of POP's, is that

levels and effects of these contaminants be studied in higher trophic level animals, e.g., marine mammals and piscivorus birds, to provide insight into the extent of contamination of the food chain by a range of compounds including "classical" high volume pollutants (e.g., PCBs, DDT/DDE, related OCs) and also new release compounds (e.g., toxaphene, polybrominated flame retardants) that may already be exerting subtle toxic and biologic effects on local wildlife. The need for such studies has been recognized by several international bodies and expert working groups. ***S. Shaw - Marine Environmental Research Institute***

Response: EPA does not question the validity of the concerns expressed, however, such studies are beyond the scope of this permit given the existing discharge limitations and the nature of the pollutants authorized for discharge. POP's include pesticides (aldrin, chlordane, DDT, deldrin, endrin, heptachlor, hexachlorobenzene, mirex, and toxaphene), industrial chemicals (PCBs) and by-products of industrial and combustion processes (furans and dioxins). These pollutants are not authorized for discharge.

B.7. Comment: In the absence of an expanded test strategy , cypermethrin and other medications which are poorly characterized with regard to toxic and biologic impacts should be banned. Also, in the absence of adequate data on toxics already present in water, sediments and marine life around the proposed facility, the notion that the application of a single substance can be allowed at certain levels in a "dilution zone", even using a "conservative" approach, may be oversimplified based on erroneous assumptions and plain lack of facts about the possible additive and cumulative effects that multiple contaminants may exert on the health of marine life in a real world scenario. ***S. Shaw - Marine Environmental Research Institute***

Response: EPA decided to prohibit the discharge of cypermethrin at this facility in the final permit based in large part on existing data which indicate the potential for toxicity under controlled conditions, and the lack of sufficient available field data regarding potential effects on the environment. Also, the discharge of any drug not approved by FDA for treating fish is prohibited at this facility. EPA agrees that the additive, cumulative, and synergistic effects of drugs that may be considered for future use at this facility should first be assessed relative to existing, identifiable contaminants in the water column and sediments, the nature of the chemical, and the manner in which the drug is introduced to the environment.

B.8. Comment: On the issue of toxicity, this is best handled through the FDA and the INAD (Investigational New Animal Drug) program. Any salmon farmer administering lice or other treatments must follow very specific protocols and instructions regarding every aspect of handling, storage, record keeping, treatment dose and duration etc... As salmon farmers, we do not have any options on this issue. Concerns and questions EPA might have regarding any and all treatments would be best addressed to the FDA as the appropriate authority to answer or find the answers to these questions. ***E. Swanson - Acadia Aquaculture***

Response: EPA agrees that all questions regarding a drug's potential environmental effects should be fully assessed prior to its availability to salmon growers which would allow for the use and discharge of these drugs in the appropriate manner without additional monitoring or restrictions. Unfortunately, the limited number of approved drugs combined with the need to combat the sudden appearance of an infectious disease or parasite has in the past precluded the opportunity to fully evaluate all aspects of a new drug's effect on the animal being treated, the target organism, and the environment. The goal of the INAD program is to make those evaluations, however, while FDA has the lead in regulating and approving animal drugs, EPA is responsible for ensuring that any discharge from this facility meets state water quality standards. EPA recognizes the importance of the INAD program in the evaluation of new drugs that can benefit not only cultured organisms, but also wild organisms that may be vulnerable to the same infection or infestation. Nevertheless, EPA's responsibility to protect water quality standards may at times require a review of the potential environmental impacts from drugs that have been approved by FDA, but are discharged to the receiving waters in a form, concentration, or manner not evaluated by FDA during the drug approval process.

B.9. Comment: In addition, fish meal fed to farmed finfish may contain surprisingly high levels of POPs such as dioxins, PCBs, and pesticides, and should be analyzed as a potentially toxic input prior to its unavoidable release into Blue Hill Bay waters and the food chain.
S. Shaw - Marine Environmental Research Institute

Response: EPA is aware of a small study conducted in British Columbia and another in Great Britain that detected elevated levels of PCBs and other organic pollutants in cultured salmon and their feed when compared to wild salmon. While these studies used small sample sizes, and apparently did not include feed used in Maine, it nevertheless points out a potential source of contaminants associated with the use of small pelagic fishes in feed. The FDA, which has regulatory authority over animal feed, samples both fish and feed for the presence of chemical toxins. Given the broad distribution of fish meal-based feed in the culture of poultry, hogs, and fish, it is likely that any feed sampling efforts would focus on the feed producer or distributor rather than the individual grower.

B.10. Comment: In Europe, the EU has banned the use of fish meal in finfish farming because of its high dioxin content. To date, levels of dioxins and other POPs in fish meal and in tissues of farmed fish as a result of discharges by Maine finfish facilities have not been investigated.
S. Shaw - Marine Environmental Research Institute

Comment: The permit should provide that there shall be no pesticide or drug residues in the salmon. Acadia should be required to test fish tissue for pesticide or drug residues. ***NELC - USPIRG***

Response: EPA understands the current ban by the EU on meat-based meal and fish meal is directed at their use in feeding cattle and other ruminant livestock, and does not include their use in finfish culture. Apparently, the concern is that meat and bone meal might be mixed in with fish meal which could provide a vector for transmitting diseases. Regarding dioxin, the European Commissioner for Food Safety is planning to set guidelines for dioxin limits on fish, fish oil, fish meal, and fish feed, as well as to develop new rules on labeling and traceability.

The FDA has primary authority to assess and regulate feed products, as well as evaluate the persistence of chemical toxins in food intended for human consumption. At FDA's Center for Food Safety and Applied Nutrition, fish tissue and feed are sampled for various contaminants. EPA will be submitting a request to FDA that it review new information which suggests that elevated levels of dioxins, PCBs, and possibly other contaminants may exist in fish-based feed used in salmon aquaculture and other animal culture.

B.11. Comments: Commentors suggested that the oil spill prevention plan should be in place prior to the start-up of the Acadia facility. ***Acadia National Park, Friends of BHB***

Response: The final permit has been modified to require that the oil spill prevention plan be in place prior to stocking fish at the facility.

B.12. Comment: Given the complexities of regulating the use of medications and therapeutants, I would again urge the EPA to work in cooperation with the Food and Drug Administration and the State of Maine to develop a scientifically-based experimental design to determine appropriate restrictions for the use of these products and Best Management Practices and protocols for their use by the industry.
C. Heinig - MER Assessment Corp.

Response: EPA-New England has developed a closer working relationship with FDA's Center for Veterinary Medicine as a result of this permit action, and EPA intends to work with the State and FDA to identify environmental concerns, monitoring requirements, and limitations associated with the discharge of drugs into Maine waters.

B.13. Comment: We are all familiar with the notorious variability and weak reliability of sediment toxicity

tests. Also, except under very unusual circumstances, it takes years for concentrations to build up to toxic levels. We therefore recommend that in the 5th year of the permit, sediment bulk chemistry be done on specific chemicals known or suspected to be used by this operation. This information will become part of the information used to base a permit renewal. ***Maine DMR***

Response: Time allows some toxins to accumulate and/or concentrate in sediments while others degrade to non-toxic byproducts. EPA agrees that sediment chemistry sampling should be conducted for persistent contaminants that have a reasonable potential to be discharged from this facility and accumulate in the surrounding sediments. Therefore, the final permit requires that sediment samples for copper must be taken prior to facility start-up as a baseline, and then every two years thereafter if the permittee has used nets impregnated with copper based anti-foulants. Sediment testing for the presence of zinc will also be required every two years if zinc is added to feed as a nutrient supplement.

B.14. Comment: I would recommend that only certain therapeutic agents be included in this sampling, based on a case by case analysis of the drug being used. ***J. Pitts - Bellwether Consulting, Inc.***

Response: Comment noted. The final permit contains language identifying the potential need to conduct toxicity tests based on the type or frequency of the drug used, or the route of its administration.

B.15. Comment: What will determine the basis for "lethal concentrations"? Inside and outside of a mixing zone? ***J. Pitts - Bellwether Consulting, Inc.***

Response: The state water quality include criteria maximum concentrations to protect against acute or lethal effects. The permit prohibits discharges that would have lethal effects to organisms passing through the mixing zone, and at the edge of the mixing zone all criteria - both acute and chronic - must be satisfied. If EPA concludes that sufficient data has been collected for a particular drug in order to establish specific lethal concentrations for appropriate test species, then such information can be used. Where lethal concentrations for a drug have been not established for specific test species, a whole effluent toxicity test and/or sediment toxicity tests may be required.

B.16. Comment: Will this [the basis for determining lethal concentrations] be judged on a specified non-target species, and who will determine that non-target species? Non-target species should be determined by the NPDES issuing agency in conjunction with the "approving" agency with input from other parties involved, e.g. materials sponsor, appropriate state agencies. ***J. Pitts - Bellwether Consulting, Inc.***

Response: The species selected for use in toxicity testing were specified in the draft permit. EPA determined the species based on a choice of marine and estuarine species used for standard toxicity testing, making sure to include a crustacean, given the drug's intended use on this class of organisms and the abundance of crustaceans in all life stages throughout Maine coastal waters. EPA is the NPDES issuing agency for this permit. If the test language were to have remained in the final permit, EPA would have considered additional species of local concern suggested by FDA, State, drug sponsor, and other interested parties, however, studies conducted by EPA have shown that standard test species represent the sensitive range of all ecosystems analyzed. Also, EPA must consider the availability of such species, particularly in larval life stages, which may make their inclusion in the permit unfairly restrictive. The culture of such organisms would require the development of specific protocols, and require an assessment of variability within and among laboratories.

B.17. Comment: If a containment net is not required for the application of certain approved materials, what then becomes of the mixing zone? ***J. Pitts - Bellwether Consulting, Inc.***

Response: In this permit, even within the water column mixing zone, lethality to passing organisms is prohibited. Therefore, if certain approved materials are applied then concentrations that ensure no lethality are required within

the pens.

B.18. Comment: Before "the sediments directly beneath the containment net" (or other mixing zone definition) is included in the NPDES permit, there would need to be justification for each material on a case-by-case basis. Some approved materials may not have a negative or significant impact in or on the sediment or the materials may no longer be toxic within the "sediment" environment. These materials would then need to be classified as non-toxic, and therefore not be prohibited in the sediment zone as written. Prohibition of the presence of certain drugs in the sediments should be determined on a case-by-case basis. The acute, sub-acute or chronic impacts of a "toxic material" will often change to a "non-toxic material" based on time , dilution, adsorption or other physical and biological changes that take place in this dynamic environment. Is a no-toxic policy reasonable, given the dynamics and variability of potential materials being used and would not the permit be better served to include probable variables in sites, materials, and non-target species.
J. Pitts - Bellwether Consulting, Inc.

Response: Maine's water quality standards require that surface waters be free from pollutants in concentrations that impart toxicity and cause the waters to be unsuitable for existing and designated uses (see, e.g., CMR §530.5(A)(1)). Consistent with EPA's obligations under §301(b)(1)(C) of the CWA, EPA has included in the permit conditions which are designed to ensure that discharges of toxic pollutants in toxic amounts will not occur. The seafloor at the proposed sites is comprised predominantly of soft, undisturbed sediments, representing a depositional environment dominated by deposit feeding polychaetes and small filter feeding bivalves. Any review of the long term degradation of an initially toxic material must also consider the short term effects to exposed benthic organisms and any other organisms that forage on them. Where adequate data have been collected for a particular material on its acute and chronic effects for all appropriate taxa and life stages, including its sub lethal, cumulative, synergistic effects, then these data will be considered when determining the appropriate regulatory response to its presence in the sediments.

B.19. Comment: Why is cypermethrin singled out and identified in this draft NPDES permit?
J. Pitts - Bellwether Consulting, Inc., M. Opitz - U. Maine

Response: At the time this draft permit was issued, there were no animal drugs approved by FDA for the treatment of sea lice, and Exis™ (cypermethrin) was the only drug covered under FDA's Investigational New Animal Drug (INAD) program in Maine for the treatment of sea lice. Acute and chronic ecological toxicity tests conducted under laboratory conditions by EPA on a form of cypermethrin used in terrestrial applications found it very highly toxic to certain estuarine species of fish and invertebrates at concentrations significantly lower than that prescribed for treatment of sea lice in net pens.

B.20. Comment: "Approved materials" are identified in the draft NPDES paragraph (above). Why has this language been changed to "drug" in mid-paragraph? The sentence should read: "Materials introduced in the bath treatment"..."then toxicity tests shall be conducted in order to verify toxicity...". This sentence presumes that all bath treatments are toxic, which may not be the case depending on the approved materials ("drugs"). Or the material's toxicity may not have a significant impact on the receiving waters or flora/fauna.
J. Pitts - Bellwether Consulting, Inc.

Response: There was no underlying intention in the use of various descriptive nouns, however, in order to provide consistency throughout the final permit, the term "drug" has been used to described any reference to the discharge of chemicals intended to treat cultured salmon for disease or parasites. The FDA regulates as drugs all chemicals used for treating cultured salmon.

B.21. Comment: If a material is added to a toxic dilution zone, why should those waters be tested? The material is approved by FDA to perform in an efficacious manner, if the farmer has complied with the label,

the material is toxic within the dilution zone. *J. Pitts - Bellwether Consulting, Inc.*

Comment: The purpose of using toxic materials, in the case of sea lice treatment, is to deliver a lethal dose to the target organism. Suggest rewording this sentence to read, "In order to prevent *release of* lethal concentrations of toxic materials *from the* mixing zone.... Also, the permit makes reference to both a toxic zone and a toxic dilution zone, which is confusing. *C. Heinig - MER Corp.*

Comment: All bath treatments are lethal at therapeutic levels to many crustaceans. Bath treatments intend to expose fish to the full therapeutic dose level throughout the treatment. *M. Opitz - U. Maine*

Response: Where the treatment of salmon in an open water net pen is concerned, the area within the net pen is considered by EPA to be waters of the United States. While a lethal response from target organisms is the intended response, non-target organisms moving through the pen immediately after the tarp is removed, or those entrained downcurrent, must be protected from lethal exposure to discharged toxic pollutants in order to comply with State water quality standards. FDA had conditionally authorized the use of cypermethrin for the purposes of gathering sufficient data to determine, among other things, the environmental effects associated with its use. The efficacy of a drug does not necessarily address the safety of the exposed environment. Where treatment is conducted in-water, the toxic effects to the aquatic environment need to be thoroughly explored. It is EPA's understanding that these effects have not yet been fully examined for cypermethrin to FDA's satisfaction, and that the drug's sponsor has withdrawn its application seeking approval prior to the collection and submission of the data requested by FDA.

Regarding the terms "toxic zone" and "toxic dilution zone" in the draft permit, both of these terms are no longer applicable, and have been removed from the final permit. The term "non-toxic materials" which was used in the draft permit to distinguish mixing zones, is also no longer needed and has been deleted from the final permit.

B.22. Comment: The use of disinfectants may be justified in cases of disease outbreaks. Disinfectants are biocides. I believe your intent is not to use biocides for cleaning of submerged nets. Appropriate wording suggested (i.e. net can be disinfected in containments or on land). *M. Opitz - U. Maine*

Response: The final permit prohibits the on-site discharge of biocides or any other sterilizing agents used to clean nets, boats, or gear.

B.23. Comment: There were several comments made on the specifics of sediment and water column toxicity testing and dye study methodology.

Response: These portions of the draft permit have been deleted in the final permit because the discharge of cypermethrin is now prohibited. Also, it became clear that EPA could not effectively anticipate the appropriate studies necessary for other drugs not yet identified. Therefore, comments related to these studies have not been individually addressed. Before any drug is authorized for discharge by EPA that is not, at present, approved by FDA for the intended use, EPA will evaluate its potential impacts to the environment. If EPA concludes that water quality standards are not likely to be violated by the discharge of this drug, then the permit may be modified to include conditions for its discharge. Any such permit modification would first require the opportunity for public review and comment.

B.24. Comments: There were several comments suggesting that the draft permit language "medication episode" be clarified. Also, the same comment providers suggested there be a distinction made between externally applied chemicals that are released to the surrounding waters and those administered orally or through injection.

Response: Comments noted, though toxicity testing requirements associated with the discharge of cypermethrin

have been deleted from the final permit. EPA and DEP will be tracking the discharge of all drugs through monthly reporting requirements. EPA will consider the potential environmental impacts from all drugs. This assessment includes the form, frequency, and manner in which a drug is discharged to the receiving waters.

B.25. Comment: I do not believe that it is the US EPA's responsibility to prescribe case by case therapeutic requirements for fish farms using legally approved agents by veterinarians or other qualified professionals. Suggest that the Draft NPDES cut that section and leave the therapy to professionals at the site who have the responsibility for the animals health. *J. Pitts - Bellwether Consulting, Inc.*

Comment: Regarding Section J, parts 1-4 (Best Management Practices for Disease Control,) I believe it is more appropriate for a licensed veterinarian to make these decisions in a strict veterinarian/client relationship and following the guidelines spelled out in the permit issued by FDA in response to NADA (New Animal Drug Application,) rather than prescribing in this permit which treatment can be applied when, or by which method or concentration. *M. Opitz - U. Maine*

Response: EPA agrees that a veterinarian is the most qualified to determine a drug's appropriate dosage and the method in which it is administered for the care of an animal, and the permit does not purport to substitute EPA's judgment on these issues. On the other hand, EPA does have the responsibility to ensure there are no adverse impacts to the aquatic environment due to discharges associated with drug applications. Where a product label's minimum effective dosage has been developed to not only ensure the drug's efficacy, but also to minimize adverse impacts to the aquatic environment, a decision to increase dosage over the label's minimum effective dosage could have environmental implications.

Under the Clean Water Act, EPA is responsible for the health of the aquatic environment, and must ensure the discharge associated with this facility does not cause significant adverse impacts to estuarine and marine life. The final permit allows licensed veterinarians to prescribe drugs in amounts or frequencies greater than those identified on the product label, or by another route of administration, as long as FDA and EPA concurs that there is sufficient data to ensure the discharge of the drug in this manner will not adversely affect the marine environment and violate water quality standards. EPA retains the right to require toxicity testing of approved drugs if deemed appropriate.

B.26. Comment: Meet with State agency representatives, experts on the Bay of Fundy and adjacent areas, University of Maine, Orono scientists familiar with sea lice treatment, the cypermethrin sponsors and others, in an effort to determine appropriate tests and testing methodology which will most effectively develop data that will protect the waters of Blue Hill Bay and other marine farm sites in Maine.
J. Pitts - Bellwether Consulting, Inc.

Response: EPA is not opposed to such a meeting and would gladly work with all interested parties, however, it is FDA's INAD program that assesses any new animal drug's effect on the environment, and has reviewed all the existing research results conducted to date. Therefore, it should be FDA that determines if such a meeting is warranted and appropriate.

B.27. Comment: All medications used in aquaculture operations have to be approved by the U.S. Food and Drug Administration after extensive review of safety data to target and non-target animals as well as efficacy against the target diseases. This includes a review of environmental safety data which is conducted under a MOU between EPA and FDA. Safety studies should be conducted prior to drug approval or, if the medication has not yet been approved, as part of studies under an INAD exemption. The monitoring requested does not serve any useful purpose. Data are already available in abundance and could be obtained from FDA. *M. Opitz, U. Maine*

Response: Drugs authorized for use under the INAD program have not yet been approved by FDA, and therefore,

potential impacts to the environment associated with the drug's discharge may not yet be fully understood. EPA agrees with the comment that safety studies should be conducted prior to drug approval, but would add that authorized use under INAD should be limited only to those facilities collecting the needed data to satisfy issues addressed under the approval process (e.g. safety and efficacy of drug on salmon, human health effects, environmental impacts,) which does not necessarily require participation by the entire industry.

B.28. Comment: The permit prohibits the use of approved anti-foulants. I would like to have access to approved anti-foulants for the following reasons: a) off-the-shelf nets are always treated. This (getting untreated nets) makes getting nets on short notice difficult. b) It makes twines tougher. Treated nets with Flexguard™ last longer and create a tougher barrier for seals. I buy my nets treated when new for this reason, but do not send them back for annual treatments. For twine conditioning, one treatment appears to be enough. c) There is research ongoing into better antifouling treatments. Should an important breakthrough develop, I would like to have access.

I don't have my nets dipped for economic reasons - treated nets do not discourage mussel sets, in fact they dramatically increase the size of the mussel sets, which are difficult to remove. Mussels need a clean substrate to set on - treated nets are ideal! ***E. Swanson - Acadia Aquaculture***

Response: The draft permit states that the permittee shall use air-drying, mechanical and other non-chemical procedures to control net-fouling organisms, and that the use of biocides for cleaning nets and related gear is prohibited (See Section I.4. and I.5, pg 15 in draft permit). The intention of these Best Management Practices was to prohibit the discharge of additional biocides through the regular maintenance of nets. The final permit recognizes that new nets are normally treated with anti-foulants, and does not prohibit the use of new nets treated with anti-foulants (though use of tributyltin is prohibited), only the re-application of anti-foulants. Recognizing the potential introduction of toxic compounds through the use of treated nets, the final permit includes additional sediment monitoring requirements associated with the use of nets treated with copper-based compounds. A request to discharge a new form of anti-foulant treatment may be authorized, but would require a permit modification which includes an opportunity for public comment prior to any changes being made.

B.29. Comment: In the event of a discharge of oil or a release of a hazardous substance, in any quantity, the National Park Service must be immediately notified. ***Acadia National Park***

Response: The final permit has been modified to require that the Acadia National Park Service be notified immediately in the event of an oil or hazardous substance spill at the facility.

B.30 Comment: The definition of a "medication episode" needs to be clear. We suggest you reference externally applied chemicals that are released to the surrounding water, but not those administered orally or through injection. ***Maine DMR***

Response: Drugs administered orally (i.e. mixed in with feed) may pose a direct threat to benthic and demersal organisms if medicated feed is not consumed by the salmon, but instead settles onto the seafloor or is eaten by other foraging wild fish. In addition, drugs administered orally through feed that are consumed, as well as those which are injected, may still pose an environmental risk if drugs are excreted through metabolic waste. The term "medication episode" has been removed from the final permit since discharge of cypermethrin is prohibited and specific toxicity testing for its discharge no longer required. The final permit requires the permittee to report to EPA any use of drugs regardless of how they are administered.

B.31. Comment: Old lift truck batteries and 5 gallon cans of chemicals have been clearly observed being stored on the very edge of one of his [the permittee] barges [at the Hardwood Is. site] where they could easily fall into the ocean. ***E. Felderman***

Response: The final permit requires the applicant to develop a Petroleum and Hazardous Material Storage and Use Plan and submit it for EPA's review and approval prior to siting any such materials at the facility. The plan is intended to prevent spills and unplanned discharges of hazardous material such as those described in the comment. Once the plan is approved, any storage of hazardous materials that is inconsistent with the approved plan would be a permit violation and would be subject to enforcement action by EPA.

B.32. Comment: A specific monitoring protocol should be required in the event that Acadia [Aquaculture] administers anti-sea lice treatments in the fish feed to assess the impact of chemicals in uneaten feed and in fish wastes. Such oral treatments are currently being administered in Canada. ***NELC, USPIRG***

Response: At present, EPA is not aware of any drugs approved by FDA for the treatment of sea lice that are introduced orally. Emamectin benzoate is an orally applied drug authorized for limited use under FDA's Investigational New Animal Drug (INAD) program, but as an INAD drug, its discharge from this facility is prohibited. The permittee may request a permit modification to allow the discharge of this drug, however, prior to any such modification EPA would review all available information on the environmental impacts of this drug and assess whether sufficient information is available to conclude that its discharge will not violate state water quality standards. Based on the amount, quality, and applicability of existing data, EPA may continue to prohibit its discharge, or authorize it with additional permit conditions and monitoring requirements, if warranted. In any case, EPA would take no action prior to providing the public the opportunity to review and comment on any proposed permit modification.

B.33. Comment: The "notification levels" in the draft permit for other toxic pollutants are astronomically high and should be lowered dramatically. ***NELC, USPIRG***

Comment: The "notification levels" are listed as concentrations rather than total quantity of the toxic discharge. If these concentration thresholds are based on previous field or theoretical studies, what levels of turbulent mixing were measured or assumed? Are the levels consistent with the physical conditions of the proposed lease site? ***N. Pettigrew - Maine Ocean Services***

Comment: Regarding the notifications to EPA, I do not know why existing dischargers are allowed 5 times the maximum concentration. Why [they] apply equally to approved materials used by salmon farmers? ***J. Pitts - Bellwether Consulting, Inc.***

Response: The notification requirements in the draft permit reflected EPA's regulations at 40 C.F.R. §122.41(l) and (2). These regulations are intended to prevent future discharges from existing dischargers above BAT (technology-based) levels of non-limited pollutants. (See preamble discussion of these regulations at 45 Fed. Reg. 33290, 33339 and 45 Fed. Reg. 33516, 33521-33523, May 19, 1980). The notification requirements may not provide sufficient protection against the routine or non-routine introduction of toxic pollutants that may violate water quality standards, because the notification level may not be sufficiently low for some pollutants, because there is no clear prohibition on the discharge between the time of notification and the time that the permit may be modified in the future. Therefore, EPA has changed this section in the final permit to delete the notification thresholds and require the permittee to immediately report the discharge of toxics in any amount that are not specifically covered under the permit.

B.34. Comment: Blue Hill Bay is a uniquely rich and complex habitat for diverse marine species including pelagic and schooling fish stocks, bald eagles, osprey, and other piscivorus birds, and marine mammals. Blue Hill Bay, along with Penobscot Bay, supports the largest concentration of the US Atlantic coast breeding harbor seal population. Harbor seals appear to be susceptible to reproductive and immune effects or persistent contaminants. The Maine coast receives considerable pollution deposition via long range

atmospheric transport that may be affecting marine life, in addition to local hotspots of contamination from industries such as Holtra Chem, Corp. that have discharged high levels of mercury into Penobscot Bay. Maine coastal bald eagle population still suffers from poor reproductive rates, and have PCB loads comparable to bald eagles from polluted areas of the Great Lakes. Pupping rates of harbor seals sharply declined from 1993-1997 in developed and polluted areas of the south coast, and leveled off in the mid-coast area of the range. The precautionary principle should rule with regard to the discharge of toxics into the marine food chain from finfish operations. ***S. Shaw - MERI***

Response: EPA agrees that toxics, including drugs, require a thorough evaluation of their potential environmental impacts before they are discharged from this facility. The final permit prohibits the discharge of all drugs, except those that have been approved by FDA for use on salmonids. The discharge of any persistent pollutant is also prohibited.

B.35. Comment: Suggest inclusion of appropriate "training for farm applications" by appropriate agencies. ***J. Pitts - Bellwether Consulting, Inc.***

Response: EPA agrees that those involved with the application of drugs should be adequately trained to do so, however, FDA has authority over the application of drugs for treating salmon and would be the most appropriate agency for establishing farm application training requirements.

B.36. Comment: The draft permit should not limit "materials" to FDA approved therapeutic agents, but also should also include USDA and EPA approved and State of Maine approved "materials" that may be beneficial to the marine environment and/or to farmed salmon culture in the future. By limiting approved materials to just one federal agency, the permit would need to be modified if advances take place or if agency responsibility is changed in the future. ***J. Pitts - Bellwether Consulting, Inc.***

Response: The FDA is the only agency that has the authority to approve therapeutic agents (drugs) for treating salmon. If this responsibility were to shift to another agency, which is unlikely, then a permit modification would be considered at that time.

B.37. Comments: Prophylactic medication and antibiotic administration are prudent and effective disease control measures. Furthermore, the conditions imposed in items 1 and 2 contravene both legal and commonly practiced disease control measures. Item 1 directly contradicts existing international, federal, regional and state regulations involving disease control. Specific examples include:

1. Annex VII North American Salmon Conservation Organization Protocols for the Introduction and Transfer of Salmonids. 1992. p. 41, specifically states the use of prophylactic medication/treatment is required: "all facilities receiving eggs will disinfect eggs with iodophors and formalin."

2. CFR 50 Part 16 (Title 50) Salmonid Importation Regulations for Fish Health, USFWS, Division of Fish Hatcheries, also specifically states prophylactic treatment is required; "all live fish eggs shall be disinfected within 24 hours prior to shipment to the United States"; Federal Register, Vol. 58, Nov. 5, 1993.

3. Prophylactic antibiotic treatment of broodstock to prevent vertical transmission of bacterial diseases is a legitimate and effective disease control measure in a wide variety of animal species. Further, usage of antibiotics in this manner has been an accepted practice procedure among federal, state, and commercial salmonid operations. Indeed, the Services (National Marine Fisheries Service and U.S. Fish and Wildlife Service) have supported, sponsored, and advocated prophylactic treatment with antibiotics (Oxytetracycline and Erythromycin) of broodstock and smolt to manage and control Bacterial Kidney Disease. The ESA Atlantic salmon listing document proposes that vertical transmission of cold water disease is a threat to the

DPS, therefore the inability to use prophylactic antibiotic treatment to prevent vertical transmission precludes effective control measures to combat this disease. This exclusion also places federal and state Atlantic salmon restoration efforts at risk. ***M. Opitz - U. Maine***

Response: In response to examples 1 and 2, the need to provide preventive treatment to live eggs has no relevance to this permit since eggs are not being stocked in the net pens. Example 3 prompted EPA to consult with the fish health experts at NMFS and the state specifically on this issue to determine if they concur that prophylactic drug treatment of broodstock and smolts is appropriate for fish already stocked in net pens. Based on this comment and information provided by other fish health experts, it appears that there may be situations when prophylactic treatment is warranted to prevent the outbreak of disease from spreading to other facilities and to wild salmon. Therefore, the final permit authorizes the prophylactic use of drugs 1) that have been approved by FDA for treating salmonids in accordance with the intended use on the product label, 2) have been prescribed by a licensed veterinarian, and 3) following receipt of written approval by EPA.

Regarding the use of Erythromycin, FDA has not approved this drug for treating salmonids raised in net pens, and therefore its use at this site is prohibited.

C. MIXING ZONES AND IMPACTS TO THE SEAFLOOR

C.1. Comment: I hereby request that, for the purpose of sediment impact zone determination, 100 feet be used rather than 5 meters. Five meters from the cage system at any given time does not allow for movement of the pens within the mooring system or for anchor creep and resetting. Acadia will occupy deep sites, and to allow adequate scope for its mooring system, the lease boundaries provide space for 600 foot rope plus ground chain and mooring compensators plus some wiggle room for placement. 3:1 scope is considered minimal. In addition, stretch is calculated into the rope selection to accommodate severe weather conditions and wave height. Rope stretch under peak current strength, particularly with moderate winds in the direction of normal tidal flow, can range up to 10-15%. With 600 feet of rope, this is 60-90 feet. The cage system is 180 feet wide. A measurement 5 meters upstream of the cages will be right in the middle of the shadow of the pen system. In addition, anchors creep, particularly after severe weather events. Resetting the anchors to within 15 feet in a deep open water site is very unlikely and would only happen by chance. Even GPS is not that accurate. ***E. Swanson - Acadia Aquaculture***

The State of Washington administers the NPDES program for EPA, and a recent Superior Court ruling affirms 100 feet as the established distance from the pens to encompass the area of the sediment impact zone. In light of normal pen movement within its moorings, this is a reasonable distance and the basis for my proposal to change 5 meters to 100 feet. ***E. Swanson - Acadia Aquaculture***

Comment: The area occupied by the net pen system (i.e., the footprint,) moves relative to the bottom as a result of changes in tidal amplitude, thus the footprint shifts across the bottom. This is particularly true in macro-tidal areas or in areas of substantial depth, such as Acadia Aquaculture's proposed site. It would seem reasonable to extend the mixing zone on the sea floor to 30 meters beyond the perimeter of the net pen, which would be consistent with the NPDES 100 ft. sediment impact zone standards applied in the State of Washington. ***C. Heinig - MER Assessment Corp.***

Comment: The mixing zone as written in the draft is an arbitrary distance, and should be removed and identified on a case by case basis relative to local siting conditions. ***J. Pitts - Bellwether Consulting, Inc.***

Response: The 5 meter mixing zone included in the draft permit was based on a distance adopted, but never codified, by Maine DMR and DEP for net pen aquaculture. EPA has made a distinction in this final permit between

the water column mixing zone and the sediment impact zone. EPA acknowledges that some movement of the pens will likely occur in response to tidal currents, winds, and sea state, however, it does not agree that the pen system would shift as much as 60-90 feet, as suggested. According to a spokesman for the company that manufactures and installs the pen system that will be used, lateral movement of the pen system at this site is likely to be less than 10 feet in any direction. Excessive movement of the pen system can cause premature wear and fatigue on the pens and mooring system. Also, mooring lines that have stretched to their designed maximum should be promptly replaced since they are at risk of parting. The use of differential GPS routinely provides accuracy to within 3 meters.

While the pen system is not likely to move 100 feet from it original moored position, the drift of fish waste and unconsumed feed in tidal currents will likely extend well beyond 5 meters of the pen system. Based on the site's average water depth, average tidal current velocity, prevailing current directions, and a known settling rate of feed pellets, EPA calculated that unconsumed feed could settle out onto the seafloor up to approximately 30 meters from the pen system. The permittee's pen system which will be at one of the deepest sites in Maine, will run perpendicular to the tidal current flow. This orientation should distribute organic material more broadly to the adjacent seafloor north and south of the pen system, but in lower concentrations than an orientation running parallel to prevailing currents. EPA now concludes that the Sediment Impact Zone should extend out to 30 meters in all directions from the pen system. Monitoring required in the final permit has been designed to identify subtle changes in benthic conditions, which will provide an opportunity for corrective actions to be taken by the permittee before impacts reach unacceptable levels.

EPA-New England was not aware of the Washington State Superior Court ruling on sediment impact zones for salmon culture. While this ruling supports a sediment impact zone similar in size to that established for this final permit, EPA's decision to extend the sediment impact zone from 5 to30 meters was based solely on the specific characteristics of this site.

C.2. Comment: It has been brought to our attention that intensive salmon aquaculture further east has interfered with the spawning of cod. ***A. and E. Johnson***

Response: EPA is not aware of any documented evidence that suggests cod spawning may be adversely affected by salmon farming. According to life history information provided by the National Marine Fisheries Service (NMFS,) cod spawn in coastal waters along most of the Gulf of Maine, as well as on offshore banks. While it is certainly possible that cod and other fish spawn in Blue Hill Bay, impacts to their spawning activity or success from the discharge at this facility are expected to be minimal, and spatially limited to within the boundaries of the sediment impact zone. The sediment impact zone for this facility is the area of the seafloor covered by the net pen system plus 30 meters in each direction. This area represents approximately 5.5 acres of the 35 acre lease site.

C.3. Comment: Models are inadequate to forecast environmental impacts or sufficient to a priori deny leases. On site monitoring is the only way to do this. Regular on site monitoring to describe impacts and meet performance standards is more effective than lease or permit conditions that impose operational restrictions. We are comfortable that by monitoring rather than prescribing operational guidelines, we all stand to gain knowledge that would otherwise not be learned. ***Maine DMR***

Response: EPA agrees that on site monitoring is the most effective way to determine actual environmental impacts from a salmon farm discharge which is why the final permit has a comprehensive plan to monitor for both benthic and water column impacts. However, EPA is not comfortable that water quality standards would be protected without establishing, in advance, specific numeric levels of impact that are unacceptable, based on the state's narrative standards.

C.4. Comment: From our own recovery studies , we know the (environmental) effects from salmon farming are temporary. ***Maine DMR***

Comment: An EIS is not warranted. Impacts are temporary and reversible. ***C. Heinig -MER Corp.***

Comment: Benthic impact under pens does not represent an irreversible or significant impact on water quality or health of the animal population in the permitted water body. Is there a balance for adverse and beneficial impacts, and who judges this? Is there consideration for transient and reversible impacts within the perimeter of the leased land? Impairment of use can always occur in any mixed-use environment regardless of aquatic or terrestrial, therefore why is this use required to meet a higher standard? Is the same standards applied to docks, marinas, and upland development? The section needs to be consistent with the known impacts of salmon farming and the extensive literature, which exists showing that the impact of suspended and settleable solids is either transient or reversible within a short period.
J. Pitts - Bellwether Consulting, Inc.

Response: Maine State water quality standards for Class SB waters, which includes Blue Hill Bay, prohibits discharges to cause adverse impact to estuarine and marine life. It also requires that receiving waters be of sufficient quality to support all estuarine and marine species indigenous to the receiving water without detrimental changes in the resident biological community. EPA finds no provision in the state standards that allows temporary impacts to violate these narrative standards beyond an established mixing zone. While a number of studies have been completed on benthic communities following the cessation of fish farm activities that suggest recovery does occur over time, most studies do not find full recovery for those indigenous species of benthic infauna which are most sensitive to organic enrichment. Even if total recovery were to take place, EPA is not aware of any condition in any state or federal permit issued to Maine farms, including this permit, which requires a salmon farm to provide ample time for conditions on the seafloor to fully recover. Also, EPA is not under the impression that fallowing has been conducted routinely by the industry in the past for the purpose of allowing benthic conditions to recover. This may be due, in part, to the spatial limitations of current sites, and the difficulty of the industry to acquire new sites. One result is that sites tend to be stocked with fish almost continuously, which provides no relief to the affected benthic community from impacts of organic loading beyond the reduction in feeding during winter months.

C.5. Comment: Here in Maine we have operated within general guidelines that years ago were informally adopted by the DEP, DMR, EPA, ACOE, NMFS, and the industry. The guidelines included boundaries (5 meters beyond the edge of the pen system) beyond which water quality standards were to be met. The intent of those guidelines has, at times, been misunderstood. We have never used the 5 meter boundary as an enforcement threshold. ***Maine DMR***

Response: It is EPA's understanding that the Maine Legislature developed a subcommittee in 1990 to study the impacts of salmon aquaculture. The subcommittee concluded that salmon farming could occur as long as non-attainment of water quality standards was confined to the area within close proximity to the pens, the area under the pens met some minimum conditions of livability, and that the remainder of the lease area away from the pens met water quality standards. While specific attainment standards were never codified, they were developed and used as a working definition of classification by the agencies listed in the comment, and considered by DEP to be consistent with its Water Classification Program.

Numeric limits in one form or another are standard in most NPDES permits for point source discharges. For this permit, EPA felt it was necessary to establish numeric limits for benthic impacts in order to allow this agency, DEP, the permittee, and the public to know in advance what levels of degradation constitute a violation of water quality standards. The draft permit included the limits originally developed by the state and federal agencies listed in the comment. The final permit has expanded on those original limits to include statistically significant decreases in certain biological metrics as attainment thresholds, as compared to reference sites.

C.6. Comment: DMR and DEP met to discuss the Zone of Initial Dilution (ZID) and agreed that the 5 meter distance is unreasonably close to the point of discharge. In Maine, ZIDs are quite variable, but nowhere are

we familiar with an offshore ocean ZID of only 5 meters. EPA commonly uses twice the total depth of the discharge. We consider the ZID to extend to the lease boundary, the area over which the State has provided the lease holder with limited exclusive rights. Our recommendation is to use either the minimum distance between the surface and the bottom, or surface and expected level of stratification, whichever is less. For Acadia, this would be 12 meters. Hence, the ZID would be 24 meters away from the 5 meter boundary, or 29 meters from the pen system. ***Maine DMR***

Comment: Although a minimal number of "violations" have been recorded, I do not believe the State of Maine has ever taken enforcement action based solely on non-compliance within the 5 meter localized zone since it has been demonstrated that DO levels consistently return to near-ambient levels within 100 meters. I am not aware of any other permit where the mixing zone is restricted to 5 meters from the point source. If there are no existing permits where the mixing zone for water column effects is restricted to 5 meters, I would recommend it be extended to 100 meters. ***C. Heinig - MER Assessment Corp.***

Comment: Where is DO measured to meet this criterion? ***J. Pitts - Bellwether Consulting, Inc.***

Response: Mixing zones are generally developed by the state to provide the minimum area necessary for a discharge to mix with receiving waters. Water quality criteria are to be maintained at the edge of the mixing zone and beyond. EPA reviewed a summary of DO monitoring information for Maine salmon farms collected over the six year period between 1994-1999, which was included in the document, "Overview of Maine Department of Marine Resources Finfish Aquaculture Program: Eight Years of Monitoring, 1992-99". The report states that out of 1,085 DO casts only 42 (4%) recorded DO violations. Some of these casts were conducted 100 meters away, but it demonstrates how infrequently they occur. Therefore, EPA believes that meeting water quality standards at 5 meters is reasonable, and extending the mixing zone is unnecessary. Upon further review of these data, EPA noticed an interesting relationship between the two sites that collectively represented 50% (20) of the violations. These sites also experienced some of the more significant benthic degradation, as revealed through reductions in the number of infaunal species present, and the hyper-dominance of pollution-tolerant capitellid worms exceeding 90% of the total abundance. Therefore, it is EPA's opinion that DO monitoring within 5 meters is not only appropriate for establishing compliance with water quality criteria, it may in some cases also provide a warning that benthic impacts are occurring.

Regarding the use of a 5 meter mixing zone at existing facilities in other locations, the State of Washington's discharge permit for salmon pens provides no water column mixing zone beyond the limits of the pen system. The permit issued by the Canadian Province of New Brunswick for salmon farms also provides no mixing zone.

C.7. Comment: We feel comfortable that the FAMP (Finfish Aquaculture Monitoring Program) protocols provide the necessary information to determine attainment of the biological standards. ***Maine DMR***

Comment: The Maine FAMP no longer requires sediment analyses, thus these are supplemental requirements not covered by the FAMP. ***C. Heinig - MER Corp.***

Response: The draft permit included the FAMP protocols in their original form. The final permit reflects changes to the FAMP that EPA feels are necessary to better identify a violation of water quality standards, which this permit is specifically intended to protect. Pre-established impact limits, increased number of samples and sampling frequency, identification and monitoring of pollution-sensitive organisms, and comparisons of on-site impacts with reference site conditions are some of the changes made in the final permit that are intended to ensure water quality standards are being maintained.

C.8. Comment: Several years ago, we discussed with EPA staff our intent to drop back to a 1.0 mm sieve size, as well as identification to family. The 0.5 mm captures more organisms, but it is as arbitrary as any other.

With the 1.0 mm sieve, we are able to process more samples, assess more areas, and provide a wider context in which results can be compared. Environmental impacts have been well described using the 1.0 mm sieve size and family level identifications. ***Maine DMR, C. Heinig - MER Assessment Corp.***

Response: EPA agrees that biologically meaningful data can be collected using a 1.0 mm mesh sieve and by identifying organisms to the family level as long as the same methods remain consistent for the duration of the facility's monitoring effort. Therefore, the final permit allows a mesh size of 1.0 mm to be used. Also, benthic analyses may be conducted at the family level, however, the final permit states that organisms shall be sorted to the "lowest practical taxonomic level" since many organisms are readily identified at the species and genus levels.

C.9. Comment: How will the direct, secondary, and cumulative impacts of this proposal (salmon farm operation) and of all recent past, present, and future foreseeable actions impact all federally, multi state, and state managed species of fish? Will Essential Fish Habitat be affected as defined under the Magnuson-Stevens Fisheries Conservation (and Management) Act as amended in 1996? ***A. Dean***

Comment: I am concerned that the section under Essential Fish Habitat lists only commercially important species, and not species most abundant in the Bay, which would include sculpins, rock gunnels and the like. Furthermore, it is not all clear whether the early life history stages (eggs and larvae) of even commercially-important species listed will be monitored. There is some evidence that Blue Hill Bay encompasses an historical spawning site for cod; in addition, it is adjacent to, and may also encompass, a spawning ground for herring. ***D. Townsend - U. Maine***

Response: While EPA has evaluated the impacts to commercial species, in part through consultation with the National Marine Fisheries Service (NMFS) for areas designated as essential fish habitat (EFH,) neither the Clean Water Act (CWA) nor state water quality standards make a distinction between these species and other indigenous species that may be affected by the discharge from this facility. State water quality standards that apply to Blue Hill Bay are intended to ensure water quality is sufficient to support all estuarine and marine species indigenous to the bay, and that no discharge cause detrimental changes to the resident biological community. Impacts to all species covered under a state or federal management plan, and all those that are not, have been evaluated to the extent that all aquatic (non-mammalian) organisms share some basic requirements (e.g., dissolved oxygen), and others can be grouped by forage and refuge requirements. Sensitivities to environmental conditions vary from species to species, and often between life stages, as well. State water quality standards for Blue Hill Bay are designed to protect the most sensitive species and life stages.

Based on monitoring data from existing sites, as well as the physical characteristics of the Dunhams Cove site, EPA expects some measurable level of change to the seafloor and benthic biotic community beneath the net pen system, and possibly extending out to a distance of 30 meters around the pens. The spatial coverage of the pens and surrounding area extending out 30 meters covers approximately 5.5 acres of the permittee's 35 acre lease site. While there are a variety of biological parameters that may be used to monitor changes to the benthic community, EPA has focused on invertebrate organisms that live within the bottom sediments (i.e. infauna) as being the organisms most sensitive to organic loading associated with the salmon farm's discharge. Most juvenile or adult fin fish are capable of avoiding an area that has insufficient dissolved oxygen (DO). Fish eggs and larvae can be vulnerable to adverse benthic conditions if negatively buoyant, however, many marine and estuarine species are positively buoyant or pelagic, and their exposure to depressed DO would likely be brief, and limited to less impacted areas of the water column above the substrate. Also, the presence of eggs and larvae are seasonal, and their abundance can be highly variable depending on successful recruitment from areas outside Blue Hill Bay. For these reasons and others, EPA chose to monitor the presence and abundance of mature infaunal invertebrates to help determine if water quality standards are being maintained. These organisms tend to be much less motile than finfish or epifauna, they are more likely to be present during benthic sampling in the soft sediments found on site, and changes in their abundance and diversity are more likely to be a result of impacts associated with the farm's discharge when compared with

reference sites.

EPA completed consultation with NMFS under the Magnuson-Stevens Act for EFH. NMFS concurred with our conclusion that the discharges associated with this facility are likely to have minimal adverse impacts on designated EFH.

Regarding the farm potentially being located on an historic cod spawning site and or herring site, cod are known to spawn throughout much of the Gulf of Maine at depths found along the coast and on offshore banks. Once cod spawn, their positively buoyant eggs drift on ocean currents, mostly within the top10 meters of the water column. Hatched larvae respond positively to light, and move into progressively deeper water as they mature. Juvenile cod tend to prefer bottoms with higher complexity than those found at this site, however, they may be attracted to this site due to increased levels of forage associated with organic loading. Young pollack and mackerel are often found in and around salmon pens, drawn to the net-pen structure, the feed, and forage species attracted by the same. In general, epifaunal and fin fish biomass are likely to increase in response to the introduction of organic matter as long as the accumulation of this material does not exceed the ecosystem's capacity to assimilate it. The benthic monitoring plan is designed to identify signs of stress associated with over-enrichment of the seafloor before it reaches critical levels.

Atlantic herring tend to prefer to spawn on gravel or other substrates of higher complexity than the soft silt and clay found in and around this site. According to state resource maps, historic herring spawning sites have been identified in the shoal waters around the south end of Long Island with suitable substrate, but the discharge associated with this facility is not expected to adversely affect spawning habitat at these locations, nor should it inhibit access of herring to these spawning grounds.

C.10. Comment: Blue Hill Bay happens to be at the fulcrum of the production of lobsters in Maine, it is the center of the lobster industry, and Blue Hill Bay itself is a well-known nursery for lobster larva. I think olfactory studies need to be done on the impact of salmon (farming) on lobster. Eels are also very susceptible to olfactory changes, and anguilla will not come into a bay where there's something wrong. This bay has been very productive for the fishery of American eels. It needs to be determined how salmon farming will effect eels coming into the bay. ***R. Bauer***

Response: EPA agrees that the sense of smell is of particular importance to both lobsters and American eels given their nocturnal habits and reliance on smell to locate food. And like salmon, lobsters and eels use olfactory organs in their homing behavior during migration. However, EPA is not aware of any published studies or anecdotal evidence that would suggest lobsters or eels would be repelled by "odors" generated by the discharge from this facility. On the contrary, video monitoring conducted for Maine DMR at existing salmon farms often reveal increased lobster and demersal fin fish activity under and adjacent to net pens, as compared to surrounding habitat. These animals may be drawn to the site by the presence (or scent) of feed, fish waste, or other foraging organisms feeding on this organic material. They may also be attracted to the anchor structures and/or the relative safety beneath the pen system, as compared to surrounding areas that may be subjected to mobile and fixed-gear fishing activities.

According to Maine DMR, most of Blue Hill Bay's lobster fishery is located south of the Dunhams Cove area, as evidenced by the presence of lobster pots. Once eggs are released by gravid females, larval lobster, which drift with the ocean currents would likely be present in the water column in Blue Hill Bay until settling to the seafloor. While conditions directly beneath the pens may deteriorate at times to the point where they are not suitable for post larval lobsters that have settled onto the seafloor, they are expected to improve proportionately with increased distance from the pen system. Benthic monitoring required in the permit is designed to detect changes in the benthic community structure, with particular emphasis on infauna that is known to be sensitive to organic enrichment. Beyond the boundaries of the sediment impact zone (i.e., 30 meters out from the pen system,) conditions on the seafloor will be required to meet water quality standards which are intended to be protective of all indigenous organisms, including early benthic phase lobsters.

C.11. Comment: The second of the annual dives should take place in late July to mid-August (not October - November,) as this is the most likely time of low dissolved oxygen levels. ***NELC - USPIRG***

Response: EPA agrees that the October - November period probably misses the peak feeding period and definitely misses peak water temperatures, however, the primary purpose of the second of the two dive surveys is to assess impacts to the seafloor from organic loading following the relatively intensive summer growing season. Dives conducted in July would likely miss the full impact of the growing season. The final permit requires the second dive survey to be conducted either August or September. Water column monitoring will occur weekly from June 1 - September 30.

C.12. Comment: A dive survey should also be required beneath the area where feed is transferred into the automatic feeders, as this is the area where significant spillage is most likely to occur. Also, the list of occurrences which may cause environmental impact should also include spills of fish feed. ***NELC, USPIRG***

Response: It is in the permittee's best interest to prevent the loss of feed as it represents the single most costly aspect of salmon farming. The permittee has informed EPA that his Dunhams Cove site will be outfitted with the same support barge design used at the Hardwood Island site. This support barge includes a superstructure that fully encloses the feed storage, transfer, and delivery system which should prevent feed from being discharged overboard unintentionally . The video/photo surveys will capture seafloor conditions along the edge of the pen system which, depending on the tidal current direction, may capture conditions between the pen system and the barge. If loose feed were spilled periodically during transfer from a support vessel to the feed barge, the combination of water depths which exceed 40 meters, and varying tidal currents would likely disperse unconsumed feed away from the barge, and over a fairly broad area.

That said, the loss of packaged feed, or any feed containing drugs, may be a concern. The comment has prompted to EPA to include in the final permit additional reporting requirements for specific incidents when feed is accidentally discharged outside the net pens. The permittee will be required to report to EPA within 24 hours the loss overboard (i.e. discharge) of any packaged feed into the receiving waters beyond the confines of the net pens that in total exceeds 25 kg. (55 lbs), or the discharge of medicated feed whether packaged or not.

C.13. Comment: Regarding benthic analysis requirements, organisms should be counted as well as being identified. ***NELC, USPIRG***

Response: The final permit includes specific requirements for conducting benthic infaunal analysis, which includes measuring absolute abundance of all infaunal organisms.

C.14. Comment: We believe that much more assessment of existing facilities must be undertaken to back up assumptions in this section (mixing zone). ***V. Newman - Sierra Club***

Comment: Has the data collected from the existing sites been fully evaluated to determine the full impact of this type of activity on our environment? ***K. Benedict***

Response: EPA reviewed selected data from benthic samples collected under Maine DMR's Finfish Aquaculture Monitoring Program (FAMP), including samples taken from the permittee's Hardwood Island site. While past monitoring has allowed us to make some basic predictions with respect to expected impacts to the seafloor from organic loading, the final permit does not rely on any assumptions. Instead, the final permit has established clear impact thresholds that EPA believe are protective of Maine's water quality standards, and a comprehensive water column and seafloor monitoring plan to fully assess the actual effects associated with the discharge from this facility, and ensure that water quality standards are being maintained.

C.15. Comment: Since the depths under the proposed salmon pens are beyond the normal divers range we would like to see a more sophisticated monitoring method then the video camera deployment now being used by the DEP. A ROV (remotely operated vehicle) would probably be more appropriate.
Friends of Blue Hill Bay

Comment: While this method (video camera mounted on a sled) may be useful around the periphery of the pens, it may be problematic, or impossible, near mooring lines and between pens. A tethered drop camera should be used in these areas. ***N. Pettigrew - MOS***

Response: The final permit requires that either a tethered drop still- or video camera be used to record conditions of the substrate. Also, the photo/video footage must be of sufficient clarity, illumination, and height above the substrate to allow for the accurate assessment of benthic conditions.

C.16. Comment: We want to be assured that if follow-up benthic studies show "adverse effects" that steps to mitigate the problem will be immediate. ***Friends of Blue Hill Bay***

Comment: The permit should include provisions for environmental mitigation, and permit revision or revocation in order to prevent long-term adverse effects on the bay. ***N. Pettigrew - MOS***

Response: The final permit includes specific monitoring requirements designed to identify benthic conditions that are approaching unacceptable levels. If one or more "warning levels" are exceeded, then the permittee should modify operations sufficient to maintain conditions within acceptable levels. If an "impact limit" is exceeded, then the permittee is required to develop and submit to EPA a recovery plan designed to restore benthic conditions to acceptable levels. If implementation of the recovery plan fails to result in sufficient recovery of the seafloor then the permit may be modified or revoked.

C.17. Comment: ***Beggiatoa*****-type bacterial growth should not be present for more than 10% of the bottom rather than 50% allowed in the draft permit (Dr. Leslie Watling, Benthic Ecologist, U. Maine, personal communication). By the time more than 10% of the bottom has Beggiatoa, serious degradation to the local benthic ecology has occurred.** ***N. Pettigrew - MOS***

Comment: Have the negative and positive effects of more or less than 50% ***Beggiatoa*** **sp. under a salmon farm been determined? If so, are there citations available? How was the 50% criteria established?**
J. Pitts - Bellwether Consulting, Inc

Comment: How will 50% ***Beggiatoa*** **coverage be determined?** ***C. Heinig - MER Assessment Corp.***

Response: The presence of sulfur reducing *Beggiatoa*-type bacteria flourishes in oxygen depleted conditions. While it is sometimes found under ambient conditions in coastal environments where low dissolved oxygen levels facilitated by topographic depressions or other causes allow for its growth, it is often associated with heavy organic enrichment under open water finfish net pens. See Findlay, R.H., L. Watling, LM Mayer. 1995. Environmental Impact of Salmon Net-Pen Culture on Marine Benthic Communities in Maine: A Case Study. Estuaries. Vol. 18: No. 1A. pp. 145-179 for a good description of the relationship of *Beggiatoa* and changing conditions in sediment biogeochemistry related to salmon culture at one site in Maine. The State of Maine has used *Beggiatoa*-type bacteria as visible indicator of organic loading for the purpose of assessing impacts to the seafloor associated with salmon farm discharges. The state informally adopted the numeric limit of 50% spatial coverage within the footprint of the pen system as being the maximum coverage allowable. The value 50% is arbitrary, but it represents visibly deteriorated conditions for greater than half the seafloor within the footprint which the state considers to be unacceptable. EPA used this value as one metric in evaluating benthic conditions under and adjacent to salmon pens

at the permittee's facility.

At 50% *Beggiatoa*-type bacterial mat coverage, benthic conditions have most likely adversely affected the infaunal organisms most vulnerable to anoxic conditions, however, some shift in benthic community structure is anticipated and acceptable within the sediment impact zone. Beyond the sediment impact zone, the presence of *Beggiatoa*-type bacteria is not permitted at levels greater than those found at reference sites.

Beggiatoa coverage will be determined by EPA through review of all video or photographic documentation collected during each semi annual inspection.

C.18. Comment: Given the marginal ability of this site to sustain discharges from long-term salmon aquaculture, due to its depositional nature, I am concerned about EPA's plan for avoidance of benthic impacts through state-of-the-art feeding systems. Even the EPA admits that such systems are not foolproof and impacts of feeding cannot be entirely eliminated by feeding systems at this time. *S. Shaw - MERI*

Response: While EPA is not certain at what level of organic loading this site will be able to effectively assimilate waste, it feels confident that the final permit's monitoring plan in combination with established numeric impact thresholds, will identify problems before they become severe, and fully protect state water quality standards beyond the sediment impact zone by requiring timely remedial changes by the permittee. If, despite the permittee's efforts to reduce the facility's discharge sufficient for recovery to occur, this permit may be modified or revoked. As noted above, if an "impact limit" is exceeded, then the permittee is required to develop and submit to EPA a recovery plan designed to restore benthic conditions to acceptable levels. If implementation of the recovery plan fails to result in sufficient recovery of the seafloor, then the permit may be modified or revoked.

C. 19. Comment: The condition in the narrative limitations that states there shall be no adverse effect to resources around and under the pens simply cannot be met. *C. Heinig - MER Corp.*

Comment: What does adversely affect mean? If this means no impact, the salmon farm will not be able to operate. *J. Pitts - Bellwether Consulting, Inc.*

Response: The term "adversely affect" was intended to support state narrative water quality standards which prohibit any discharge to class SB waters from causing an "adverse impact" to estuarine and marine species indigenous to the receiving water. EPA intended this condition to apply to areas beyond the sediment impact zone. The final permit replaced "adversely affect" with "cause adverse impacts" in conditions #5 and 7 of the narrative limitations to be consistent with state water quality standards. The final permit also includes language that clarifies that these limitations apply to areas beyond the designated water column mixing zone and sediment impact zone.

C.20. Comment: There are two paragraphs that describe impact thresholds beyond the mixing zone which are substantially similar. The language in both paragraphs suggest that a significant shift in benthic community structure of any kind is unacceptable. It is possible that both biomass and diversity increase over baseline conditions, which would suggest a positive shift. I would therefore suggest that the language be changed to significant negative shift in benthic community structure. *C. Heinig - MER Corp.*

Comment: Who and how will the NPDES [program] deal with beneficial "significant shifts" in the benthic community as it relates to salmon aquaculture? *J. Pitts - Bellwether Consulting, Inc.*

Response: EPA agrees that a distinction should be made in defining a significant shift in benthic community structure, and accordingly, has revised the language in this section of the final permit so that it more closely resembles the state's narrative water quality standards. Any changes in benthic community structure will be monitored and evaluated relative to baseline and reference site conditions.

C.21. Comment: With respect to thresholds beyond the mixing zone, since the Maine DEP water classification regulations are used to support this section, it is important to note that those regulations define degradation as "detrimental changes in the resident biological community" (38 MRSA §465-B. Standards for classification of estuarine and marine waters). Exactly what constitutes "detrimental changes in the resident biological community" and how this is measured is a matter of continuing discussion. *C. Heinig - MER Corp.*

Response: For waters classified as SB, which includes Blue Hill Bay, 38 MRSA §465 (B) states that discharges shall not cause adverse impacts to estuarine and marine life in that the receiving waters shall be of sufficient quality to support all estuarine and marine species indigenous to the receiving water without detrimental changes in the resident biological community. As with other narrative water quality standards, this provision is open to interpretation as to the appropriate permit limits needed to ensure compliance. EPA's interpretation in this case, which has been coordinated with DEP, has resulted in the establishment in the final permit of "impact limits". Should the state adopt different numeric limits to enforce its narrative standard, the permit may be modified with the opportunity for public review and comment.

C.22. Comment: There is reference in the draft permit to an approved sampling plan, but no specific requirement to develop such a plan. *C. Heinig - MER Corp*.

Response: The final permit includes a detailed benthic sampling plan.

C.23. Comment: Within the limited space occupied by a salmon farm within a suitable body of water, as prescribed by the State of Maine siting guidelines, the constraints listed in this section are not justified on the basis of protecting water quality nor can they be justified under the Clean Water Act. There is no evidence that "exceeding a 90% hyper dominance by one taxa", or the entire salmon farm footprint area being capable of supporting infaunal and epifaunal animals has anything to do with water quality degradation with a suitably sited farm, or that benthic flora or fauna health in that bay will be degraded.
J. Pitts - Bellwether, Inc.

Response: Protecting water quality standards is a primary goal of the CWA. A state, in administering or certifying a discharge permit under the CWA, has the discretion to establish or allow a mixing zone in order to provide a discharge the opportunity (spatial) to mix with the receiving waters prior to meeting water quality standards. In 1991-1992, a numeric limit of 90% hyper dominance of any one taxa, and other minimum livability requirements were developed by the state (DMR and DEP) - but never codified - in coordination with NMFS, EPA, FWS, U.S. Army Corps of Engineers, and the industry for the area beneath salmon pens and extending out 5 meters. In this final permit, EPA has included what have long been considered by state and federal regulators, and the industry, reasonable minimum requirements for benthic habitability under net pens. In certifying this permit, Maine DEP has concurred that these requirements, and others included to protect state narrative standards beyond the sediment impact zone, are consistent with state water quality standards.

C.24. Comment: Regarding the definition of the mixing zone, does the "perimeter zone" refer to the mooring of the site? *M. Opitz - U. Maine*

Response: EPA does not consider the perimeter of the net pen structures to include moorings. It is limited to the net pens and the surrounding walkways.

D. IMPACTS TO PROTECTED SPECIES

D.1. Comment: Regarding special conditions for each salmon to carry a mark. Acadia/Trumpet Island Salmon is a small and the last remaining family-owned salmon farm in Maine and to my knowledge the U.S. These are not vertically integrated companies but are strictly specialized in the net pen aspect of the business. As such, Acadia/Trumpet must purchase its smolts from commercial suppliers and does not have any control over marking smolts. Just as I must rely on truck manufacturers to comply with safety and environmental regulations, I must rely on the smolt producers to provide me with smolt that meet EPA requirements.

At the moment, Acadia is the only commercial salmon farm in the world with this marking requirement. In the event that such marked fish are not commercially available, a provision must be made to waive this requirement until such fish are commercially available. Just as it would be unreasonable for EPA to place special emission standards only on my vehicles and diesel engines above those commercially available to the public, or require the public to produce their own individual vehicle identification numbers and attach them to specific points on their cars, it would be unreasonable to require special smolt marking conditions specific only to my farm. This responsibility and requirement must be addressed with the commercial smolt producers and coordinated with the marking activities of agencies and countries. To date, there is no program in place, governmental or private, to coordinate these activities or advise smolt producers how or where to mark smolts. ***E. Swanson - Acadia Aquaculture***

Response: The draft permit included marking language identical to language included in the Army Corps of Engineers's (Corps's) River and Harbors Act section10 permit for this facility issued on May 15, 2000. The marking requirement was among other special conditions included in EPA's draft permit intended to protect remnant populations of wild Atlantic salmon, which represent an existing use of the receiving waters. On November 17, 2000, a distinct population segment (DPS) of anadromous Atlantic salmon in the Gulf of Maine was listed as an endangered species. According to the July 1999 "Review of the Status of Anadromous Atlantic Salmon (Salmo salar) under the U.S. Endangered Species Act" developed by the Services, among the many threats to the continued existence of the DPS, the most serious threat to the genetic integrity of wild salmon within the DPS is the interaction with aquaculture escapees.

While EPA is committed to ensuring that the discharge from this facility meets state water quality standards and protects existing and designated uses, it also recognizes the unique and difficult situation facing the permittee as the first salmon farmer required to abide by new federal smolt marking regulations. However, being the first in line provides the permittee with the first choice of marks. According to NMFS, while tagging the adipose fin is currently practiced by researchers monitoring the return of wild salmon, the tagging of another fin (e.g. caudal fin) could easily be accomplished and would serve the intended purpose. The possible requirement of tagging smolts has been discussed between the Services and the industry since at least 1999. Within the last year a group of individuals representing federal and state agencies, conservation groups and the salmon industry, have been working together to develop possible solutions to the various issues related to industry-wide marking of smolts. In addition, the Corps is currently in formal section 7 consultation with the Services for the permitting of all existing and future salmon farms under the Rivers and Harbors Act. Based on the Services' response to the recommendations of the smolt marking working group, and/or the results of the Services' section 7 consultation with the Corps, EPA may modify the existing marking requirement in this final permit to be consistent with industry-wide requirements. Before any such permit modification is made, EPA would be required to reinitiate section 7 consultation with the Services, as well as provide the public an opportunity to review and comment on proposed modifications.

D.2. Comment: Acadia should require reporting of all escapes not just those greater than 500. ***NELC***

Comment: 500 escaped fish is large compared to the existing numbers in the river. How was this derived? ***N. Pettigrew - Maine Oceanographic Services***

Response: The requirement that the permittee report all escapes of over 500 was derived from a list of recommended conditions developed by the Services' and submitted to the Army Corps of Engineers, dated 15 May 2000, to be incorporated into all RHA section 10 permits for marine aquaculture facilities. The Biological Opinion issued for this permit also included a recommendation to include this condition. It is EPA's understanding that the limit of 500 was included because it represented the number of fish that would have to escape before a noticeable reduction in feeding requirements to a particular pen would occur. EPA has modified this condition in the final permit to require the reporting of any known or suspected escapes, since there are other indications that may indicate that fish have escaped. Such indications include the presence of salmon swimming outside the pen system, large tears observed in containment nets, the accidental discharge of smolts outside the net pens during transfer, or the presence of a seal in a net pen.

D.3. Comment: The aquaculture industry should be required to fund a program for monitoring the eight salmon rivers for escaped salmon. ***NELC***

Response: This suggestion is beyond the scope of this permit. However, it is the intent of the Agency to evaluate this proposal as it works with the state and federal regulators on issues related to MEPDES permits that will be issued for the other salmon farms in Maine. Presently, Atlantic salmon ascending the Union River are monitored at the Ellsworth dam.

D.4. Comment: EPA is relying on adequate marine containment systems to protect the endangered salmon. Based on the applicant's existing practices at the Hardwood Island site (disrepair due to financial limitations), the applicant should provide to EPA and public a detailed containment plan and financial plan, to assure his ability to comply with containment system integrity and maintenance conditions for the term of the lease. ***S. Shaw - MERI, D. Hayes***

Response: EPA typically does not evaluate a permit applicant's financial ability to comply with permit conditions when making a decision whether to issue a permit. If the permit is violated, there is a range of enforcement options available to EPA, as well as the opportunity for citizen suit, to ensure that compliance is achieved. In addition, EPA's regulations (40 CFR § 122.64) authorize the Agency to terminate a permit in the event of noncompliance or where necessary to prevent endangerment of human health or the environment.

D.5. Comment: It is unconscionable that Mr. Swanson (the permittee) has been allowed to farm genetically altered salmon without environmental impact studies. ***E. Felderman***

Response: While specific restrictions regarding the use of genetically modified salmon were not included in the U.S. Army Corps of Engineers (Corps) section 10 permit issued in 1993 for the Hardwood Island site, EPA has no reason to believe that genetically altered fish have ever been stocked at that facility. The culture of genetically altered fish would first require approval from FDA. For the Dunham's Cove site, both the Corps and EPA permits prohibit the stocking of transgenic salmonids at that site.

D.6. Comment: We recommend that the permittee be required to submit a Loss Control Plan prior to construction and operation of the facility. Having a finalized plan in place before activities begin will help ensure that any problems that develop early on can be addressed to prevent impacts. ***Acadia National Park***

Comment: The Integrated Loss Control Plan should be submitted for approval by EPA, with concurrence by USFWS and NMFS. ***NELC, US PIRG***

Response: EPA agrees with these comments. The final permit requires that at least 45 days prior to transferring fish to the facility, the permittee shall submit an integrated loss control plan for EPA's review and approval. Though not mentioned in the permit, EPA intends to seek the Services' comments on the adequacy of the plan in minimizing fish

escapes before approving the plan.

D.7. Comment: Genetic material must specifically include sperm as well as eggs and living organisms. ***V. Newman - Sierra Club***

Response: For the purpose of this discharge permit, one form of genetic material need not be distinguished from another since its form is not regulated by this permit, only its presence in a fish to be stocked at the site. The language contained in the draft and final permits was carefully developed through consultation with the Services to ensure that fish are not introduced to the net pens that contain genetic material that is of non-North American origin. EPA agrees with the comment when it applies to the importation of such genetic material, but that issue is not applicable to this permit.

D.8. Comment: We strongly support the absolute prohibition on transgenic salmonids and the requirement to mark the fish. ***NELC, US PIRG***

Response: Comment noted.

D.9. Comment: The prohibition on reproductively viable non-indigenous strains, with which we agree, addresses only the genetic impacts of successful interbreeding. It is not, in itself sufficient to address other adverse impacts of interactions between farm and wild salmon, including competition between reproductively viable wild fish and sterile farm fish for mating opportunities and spawning sites. ***NELC, US PIRG***

Response: EPA agrees that this condition does not in itself address all concerns related to the release of non-native salmon. It is one of ten special conditions contained in the draft and final permits designed, through consultation with the Services, to minimize potential threats associated with salmon net pen operations to the continued existence of native Atlantic salmon.

D.10. Comment: Has formal consultation been undertaken with the USFWS and NMFS of all proposed, threatened, and endangered listed species that maybe impacted adversely by this proposed action as is required under section 7 of the Endangered Species Act? ***A. Dean***

Response: Formal consultation with the Services was initiated on 4 December 2000, and completed on November 14, 2001. The Services concluded that issuance of this permit is not likely to jeopardize the continued existence of the Atlantic salmon Gulf of Maine DPS. In addition, they concurred with EPA's opinion that this facility was not likely to adversely affect other federally listed species found in the area.

D.11. Comment: Any permitting scheme must prevent interactions between farm and wild salmon, create ways to publicly document the effectiveness of containment systems and practices, enforce permit restrictions on fish escapes, and ultimately force technology improvements, both in net pen systems and in newly emerging land-based and closed containment systems. ***NELC, USPIRG***

Response: Through formal consultation with NMFS and USFWS (the Services) under the Endangered Species Act, EPA has included in the final permit conditions which have been developed specifically for preventing farm raised salmon from escaping to the receiving waters, which includes the requirement for the permittee to install and maintain a fully functional marine containment system designed to minimize the potential for fish escapement. In addition, an integrated loss control plan, which includes details of pen system maintenance and monitoring, predator control, fish transfer procedures, contingency escape recovery protocols, and storm preparedness measures, is required prior to the stocking of fish on site. The final permit incorporates all procedures and technologies commercially available that are designed to minimize the unintentional release of farmed salmon to the receiving waters. The Services have assisted EPA in developing these permit conditions, and support them.

D.12. Comment: This facility must be designed to minimize access by seabirds and marine mammals so that any alleged need for incidental take would be obviated. ***V. Newman - Sierra Club***

Response: It is in the permittee's best interest to prevent the loss of salmon from predation by birds or marine mammals. At present, the permittee keeps the net pens at his Hardwood Island site covered with bird netting, and maintains a sound deterrence system to discourage seals from attacking the pens from underwater. The permittee intends to use the same preventive measures at the Dunhams Cove site. EPA has removed from the final permit special condition #11 regarding the reporting requirement for any incidental take of marine mammals, however, the same condition is included in the Army Corps' Rivers and Harbors Act section 10 permit for this facility. While interactions with marine mammals is an important issue, it is beyond the scope of an NPDES discharge permit, except when seal intrusions cause the release of salmon into the receiving waters. The permittee is required to provide an integrated loss control plan to EPA for review and approval before any fish are stocked on site. This plan will include, among other things, the installation and maintenance of predator deterrence devices. EPA intends to coordinate with NMFS and USFWS on the draft plan prior to approval. In addition, the permittee is required to report to EPA within 24 hours any unusual events which could cause or contribute to the escapement of fish. Such events would include damage to nets caused by a seal attack.

D.13. Comment: Acadia [Aquaculture] should be required to prepare and submit for approval a code of practice for transferring smolts into and out of net pens that will minimize the possibility of escapes. ***NELC, USPIRG***

Response: EPA agrees with the intent of the comment, but considers codes-of-conduct to be more applicable to the entire industry. Alternatively, EPA has included in the final permit a condition that requires the permittee to develop an integrated loss control plan, which will be reviewed and approved by EPA prior to any fish being stocked at this facility. One aspect of the plan that will have to be addressed is the manner in which smolts are transferred to and from net pens. EPA intends to provide the Services an opportunity to review and comment on the proposed plan in order to ensure it is consistent with existing methods and procedures for preventing fish escapes during transfer.

D.14. Comment: Acadia should be required to prepare site-specific sea lice management plans that are designed to achieve the goal of no lice present during [wild] smolt out-migration. To reduce the incidence of sea lice and the need for chemical sea lice control methods, sea lice management plans should include measures for fallowing sites and for restricting each site to a single year class of salmon. ***NELC, USPIRG***

Response: EPA agrees in concept with a management plan designed to prevent sea lice infestation at all times, and especially during periods of wild salmon migration in and out of local rivers, however, such a plan needs to be established industry-wide if it is to be effective. Site fallowing and year class separation would be less effective and possibly be unfairly restrictive when incorporated into the permit for a single facility. Alternatively, they would be more effective if included in Maine DEP's forthcoming general permit for existing facilities. Any such plan should be developed through coordination with the salmon farm industry, state agencies, fish health professionals, the Services (NMFS and USFWS) and public interest groups.

D.15. Comment: At the beginning of August (2000), a number of people, myself included, viewed an adult salmon swimming in a somewhat lethargic manner around the edge of the Kollegewidgwock Yacht Club, in outer Blue Hill Harbor. The fish was at least two feet long. Blue Hill Harbor is not the site of any known salmon runs, nor is it the time of year when wild salmon would begin a run upstream. The only conclusion we could reach as to the origin of the fish was that it was an escapee from Mr. Swanson's pens off Hardwood Island. ***E. Best***

Response: The fish may have escaped from the Hardwood Island site, or it may have been a wild fish attempting to find the mouth of the Union River. According to the Services (NMFS and USFWS,) adult Atlantic salmon begin

ascending New England rivers beginning in the spring and continuing into the fall, with peak movement occurring in June. The majority of fish returning to the Ducktrap River - the closest river with a known remnant population - enter fresh water after mid-July. This permit requires the permittee to mark all fish stocked at the Dunhams Cove site so that their source can be readily identified. EPA expects that all sites in New England will have similar marking requirements in the near future. In addition, this permit establishes special conditions designed to prevent and minimize the escapement of cultured fish to the receiving waters.

D.16. Comment: There are numerous reports of salmon in the Union River, and we anticipate efforts to focus on the Union River will be made in the near future. ***Friends of Blue Hill Bay***

Response: Observed returns of wild fish are certainly encouraging, but unfortunately a dam located in the lower part of the Union River currently prevents salmon from accessing spawning habitat upstream.

D.17. Comment: Is Conditions 1 and 2 of Section G (Special Conditions) under the jurisdiction of EPA? Because of the competitive disadvantage being placed on some segments of the aquaculture industry and the controversy surrounding this issue, the term "prohibition" appears extreme and prevents further scientific evaluation. Gene technology provides opportunities for creating more disease resistant fish, which could reduce the need for use of medications. Opportunities should be provided to continue research in this area. ***M. Opitz - U. Maine***

Response: Condition 1 is as follows: 1. Reproductively viable non-North American Atlantic salmon stocks are prohibited at this facility. Non-North American Stock is defined as any Atlantic salmon (*Salmo salar*) which possess genetic material derived partially (hybrids) or entirely (purebreds) from any Atlantic salmon stocks of non-North American heritage, regardless of the number of generations that have passed since the initial introduction of the non-North American genetic material.

Condition 2 is as follows: 2. Transgenic salmonids are prohibited at this facility. Transgenic salmonids are defined as species of the genera *Salmo, Oncorhynchus* and *Salvelinus* of the family Salmonidae and bearing, within their DNA, copies of novel genetic constructs introduced through recombinant DNA technology using genetic material derived from a species different from the recipient.

EPA recognizes that the effective containment of salmon within open water net pens is not guaranteed, even when the salmon farm operator utilizes the appropriate gear, mooring design, maintenance strategy, and escapee recovery methods. The risk of wild Atlantic salmon interbreeding with commercially cultured salmon that contain genetic material originating from locations beyond North America has been identified by the Services as one of the greatest threats to the continued existence of a distinct population segment of anadromous Atlantic salmon in the Gulf of Maine. Similarly, the Services consider the release of transgenic fish - fish with genetic material derived from a separate species - to represent a possible threat to wild Atlantic salmon populations from genetic or ecological effects.

Since this permit is for a net pen facility, and since such facilities may unintentionally release farmed salmon into the wild despite the grower's best intentions and efforts to prevent such a release, EPA has incorporated language into the permit prohibiting the stocking of fish of non-North American strains within the net pens of this facility. The permittee has expressed no interest in conducting scientific research on gene technology at his facility. EPA believes the lack of flexibility in this condition is appropriate for this facility given the status of wild Atlantic salmon populations in Maine. While this permit is specific to one facility only, EPA anticipates similar prohibitions in discharge permits issued by Maine DEP for all salmon farms in Maine, so there should be no competitive disadvantage as result of these permit conditions.

D.18. Comment: Regarding Special Condition #3, no regulatory mechanism for certification of their Condition 1 or 2 currently exists. The agency and standards for certification of conditions are not stated. At

present, no standards, procedures, or quality control mechanisms exist to establish certification of Conditions 1 and 2. *M. Opitz - U. Maine*

Response: It is EPA's understanding that the hatcheries which raise smolts for the commercial salmon industry have full knowledge of the genetic lineage of all smolts produced at their facilities. Therefore, EPA expects the permittee to receive written certification from the source hatchery stating that fish transferred do not bear any genetic material within their DNA that is of non-North American origin. Similarly, the hatchery shall certify that the fish transferred do not bear within their DNA any genetic material originating from a species other than *Salmo salar*. Compliance with these permit conditions may be assessed through genetic testing at any time by EPA, or through coordination with other agencies.

D.19. Comment: Identifying each fish with a site specific, permanent mark will be a significant requirement that needs further research. This requirement can have significant economic impact while at the same time provides little of environmental quality return. Handling and marking of each fish will cause stress, and still has an unknown effect on production efficiency. Reduced production efficiency means reduced efficiency of inputs into the system, such as feed utilization. The stress caused to the fish will also increase the risk of disease which might offset any benefit perceived by the agency. *M. Opitz - U. Maine*

Response: Activities such as smolt introduction to saltwater, smolt transfer from hatchery to net pen, fish counting, grading and sorting, and drug therapy procedures all can cause stress to cultured fish, but at times may be necessary. The process of marking fish has evolved over the years, and the practice is widely used in research to study movements of wild fish, including salmon.

D.20. Comment: I believe inventory records are routinely sent to Maine DMR. In order to reduce paperwork it would be advisable to design a reporting system that goes to one point only. It appears logical to have DMR as this collection point, and EPA could receive data from DMR. *M. Opitz - U. Maine*

Response: This reporting requirement is the responsibility of the permittee, not DMR. In the future, a system may possibly be established that allows multiple agencies to access the same farm inventory data base, however, such as system does not exist at present.

D.21 Comment: Based on all my expressed concerns and the fact that Maine's native Atlantic salmon have been listed as endangered, I believe approval for this project should be declined at this time. *K. Benedict*

Response: EPA believes this permit will adequately protect state water quality standards, and agrees with the opinions of both the National Marine Fisheries Service and U.S. Fish and Wildlife Service that the facility's operation is not likely to jeopardize the continued existence of native Atlantic salmon in Maine.

E. COMPLIANCE WITH PERMIT CONDITIONS

E.1. Comment: The State of Maine's prior performance with regard to monitoring, including data collection, analysis of data, and dissemination of data to the public is not reassuring, nor does it seem adequate to protect water quality under the CWA. DMR waived the requirement under the Army Corps of Engineer's permit for the permittee to perform basic monitoring of water quality (DO, salinity, and temperature levels) twice monthly during the period July to September since 1994. *S. Shaw - MERI*

Response: This permit is being issued by EPA, and all monitoring requirements contained within it are mandatory, and enforceable by EPA. Modifications to the monitoring plan would only be considered after review of new information not available during the development of this permit, and EPA would provide opportunity for public

review and comment on the proposed modifications before making final changes.

E.2. Comment: Enforcement of the monitoring requirements is also of concern. It appears that the State has allowed for less stringent requirements than that of the Army Corps of Engineers. This raised the concern that the monitoring requirements of the NPDES permit will not be adequately enforced.
Friends of Blue Hill Bay

Response: All the monitoring requirements identified in the final permit are tracked by EPA and Maine DEP through the mandatory monthly submission of a Discharge Monitoring Report. Monitoring that is not conducted and reported as scheduled in the permit represents a permit violation enforceable by EPA. The final permit provides detailed guidance on sampling locations, sample sizes, and frequency.

E.3. Comment: Penalties and liability should be spelled out due to negligence by the operator, and bonding should be required. ***V. Newman - Sierra Club***

Comment: Unless the applicant can demonstrate that financial structures and resources (including personnel) are in place to install, maintain, and continue to develop and improve feeding methods so as to prevent benthic impacts, this plan would appear to be based on overly optimistic assumptions about a technology that is far from being proven to be safe. ***S. Shaw - MERI***

Response: Section 309 of the Clean Water Act provides a range of enforcement sanctions in the event of a permit violation or discharge without a permit, including monetary penalties. Strict liability applies in the case of civil violations. Criminal sanctions may be sought for wilful or negligent violations. Part II of the permit, which contains the general conditions, includes a condition which restates the penalties provided in the Clean Water Act. We see no basis for requiring a bond from the permittee in anticipation of a violation.

E.4. Comment: My father owns Hardwood Island. I have observed employees of Mr. Swanson taking material collected from the fish pens and dumping it in the middle of the bay. Based on the size of the containers, I can only assume he is discarding dead fish. ***E. Felderman***

Response: Only those materials authorized for discharge and identified as such in the final permit may be discharged, and only from the net pens. The discharge of dead fish anywhere in the bay is prohibited. While this permit is specific to the Dunhams Cove site, the Hardwood Island site is covered under an Army Corps section 10 permit and a Maine DMR license, both of which prohibit the discharge of dead fish into state waters. Actions that are viewed as possible violations to any permit should be brought to the attention of the permit issuing agency immediately. Any violation of permit conditions contained in this final permit may be subject to enforcement action by EPA, and may also represent violation of other existing state and federal permits.

E.5. Comment: The draft permit indicates that no other species of fish may be raised in this facility; what about shellfish (e.g., mussels)? ***Acadia National Park***

Response: Shellfish culture was not included in the permittee's NPDES permit application. Therefore, it has not been included and is not authorized at this facility. At the permittee's request, the permit may be modified to include shellfish culture, however, this modification would first require the opportunity for public review and comment on the proposed permit changes.

E.6. Comment: All monitoring data and all information used to determine compliance with effluent standards, including inventory tracking information and other data needed to determine fish escapes, should be available to the public. ***NELC, USPIRG***

Response: All monitoring and compliance information submitted to EPA by the permittee is considered public information unless the permittee submits to EPA a written request to restrict certain information that qualifies under 40 CFR (Part 2, Subpart B. §2.201 - 2.215) as confidential business information (CBI). Upon receipt of such a request, EPA would review the request and make a determination as to what data, if any, should be protected as CBI.

E.7. Comments: Several commentors requested clarification on the term "nuisance species" since the draft permit prohibits the discharge from producing, or result in, undesirable or nuisance aquatic species. In addition, one comment received suggested that the presence of salmon farms in Blue Hill Bay would attract additional seals, which in turn, would put further pressure on dwindling cod stocks. Other comments suggested that seals are valued members of the Blue Hill Bay community, and should be protected from any harassment by salmon farmers.

Response: Examples of what constitutes a "nuisance" species clearly depends on one's perspective. EPA acknowledges that this language could be interpreted in different ways. The primary intent of the condition was to prohibit the discharge from causing or contributing to a bloom of noxious algae, however, the more generic language in the permit allows EPA to respond to circumstances where one or more organisms cause unanticipated problems (i.e., a nuisance) that may in turn cause or contribute to a violation of water quality standards.

E.8. Comment: Who has the burden of proof in determining whether a plankton bloom is associated with a farm? ***N. Pettigrew, Maine Oceanographic Services***

Response: The permittee is responsible for the sampling, analyses, and reporting of all water column monitoring requirements. EPA may seek assistance from state agencies or internal laboratories, or may request additional information from the permittee, in an effort to assess whether or not the facility's discharge is causing or contributing to a plankton bloom. However, it is ultimately this agency's responsibility to determine if a permit violation has occurred.

E.9. Comments: There were several comments related to the monitoring and enforcement of permit limits; either raising concerns that they would not be monitored or enforced stringently enough, or questioning how EPA might respond to periodic and minor excursions of water quality limits (e.g. dissolved oxygen). ***C. Heinig - MER, Friends of Blue Hill Bay, N. Pettigrew - MOS, R. Bauer***

Response: Consistent with most NPDES discharge permits, EPA relies to large degree on monitoring reports submitted by the permitted discharger. However, EPA can make site visits to the facility (either announced or unannounced) to make inspections and conduct independent sampling, to ensure the permittee is complying with permit conditions. In addition, EPA may work with DEP and other state and federal agencies to monitor permit compliance, as well as respond to reports by the public of possible permit violations. EPA maintains enforcement discretion over any violation of this permit, and may chose from a number of enforcement options based on the specifics of the violation

E.10. Comments: There were several comments concerning water quality parameters that do not have a numeric limit, but are instead "report only." Some questioned how or if EPA can assess water quality violations without numeric limits; others suggested limits be imposed for nutrients such as nitrogen, phosphorus, and ammonia. ***K. Benedict, N. Pettigrew - MOS, C. Heinig - MER***

Response: EPA has imposed "monitor only" requirements on certain pollutants where there is not sufficient basis to conclude that they have a reasonable potential to cause or contribute to a violation of water quality standards and therefore to impose numeric effluent limits. On the other hand, it is important to have the pollutant levels monitored, in the event that aquatic impacts do occur. Also, the monitoring of nutrients will result in a better

understanding of the bay's nutrient levels and how they might be affected by the introduction of nutrients by the facility. The diffuse nature of the discharge plume from a salmon farm complicates the effective monitoring of most constituents in the discharge. Therefore, EPA has decided to require the effects of the discharge to be monitored by assessing impacts to the sediments, benthic community and water column in close proximity to the facility and compare them to reference areas with similar biological and physical characteristics.

E.11. Comment: The requirement to sample for total phosphorus seems unnecessary since in marine waters it is typically present in concentrations which exceed the demands of phytoplankton, and would only add cost and manpower required to do daily water analyses at four different locations in and around the net pen. ***J. Pitts - Bellwether Consulting***

Response: While phosphorus is generally not a limiting nutrient in marine waters, a shift in its abundance relative to nitrogen can affect the make up of the resident phytoplankton community. In the final permit, phosphorus and other nutrients are sampled monthly from June to September.

E.12. Comments: What constitutes a violation at a grab point? The language "beginning effective date" could refer to the date of first use of treatment of a certain continuous duration, or to the date when the therapeutic treatment becomes efficacious for the drug in question. Is "expiration" the end of the particular treatment event or at the end of the treatment episode? ***J. Pitts - Bellwether Consulting***

Response: A violation at a grab point would be the exceedence of a pollution parameter for which a numeric limit exists (e.g. dissolved oxygen), based on a single, or multiple samples (grabs). The "effective date" of the permit is simply the date the permit becomes effective following the final permit decision. NPDES permits are effective for a fixed period not to exceed five years, at which time they expire unless administratively extended.

E.13. Comment: The "experienced contractor" required for the independent assessment of the containment system should be approved by the EPA. ***N. Pettigrew - MOS***

Response: EPA agrees that quality assurance is essential to the collection and analysis of quality data, and has included in the final permit a requirement that the permittee submit, for EPA's review and approval, documentation of an employee's or contractor's demonstrated capabilities to conduct such work. This requirement includes the assessment of containment systems.

E.14. Comment: With regard to the clause "... shall not cause or contribute to violations of water quality standards.", if though the permittee remains in compliance with all of the conditions and limitations of this permit, at some future date the water body is found to be in violation of the water quality standards for its classification due to subsequent development in the area, could the permittee be considered to be a contributor to the violation, and if so, what might the consequences be? Would limitations and penalties be applied equally to all contributors? If not, how would individual penalties be assigned and limitations applied? ***C. Heinig - MER Corp.***

Comment: Who is included in the "or contribute to violations" beyond the farm and how are these quantified as to impacts? Are upland residents, recreational impacts, upland activities and industry, aquatic enterprises all factored into a formula to determine the "contribution"? This would seem to be a very subjective decision. ***J. Pitts - Bellwether Consulting. Inc.***

Response: In the final permit, "... or contribute to..." has been deleted from Condition 8 under Narrative Limitations (Section G). Maine DEP would determine whether or not a water body is in attainment of its classification, and if not, why it is in non-attainment. Depending on the cause of non-attainment, a salmon farm may or may not be considered a contributor, but as long as the salmon farm (or any permitted discharger) is in compliance with the

terms and conditions of its permit, there would be no cause for enforcement action. If non-attainment stems from excess nutrients, Maine DEP would likely assess all known point and non-point sources of nutrients that might be contributing to the problem, including agricultural runoff, terrestrial wildlife sources, industrial and public waste water discharges, and oceanic contributions. A total nutrient load reduction target goal could be established to bring the water body back into attainment. Based on the sources identified, waste load allocations and load allocations would be developed for those point and non- point sources. This new information may be used to justify a modification to existing permit limits in order to meet the established goals.

E.15. Comment: Compliance with the December 15 deadline for reporting results will depend on the permittee's timely receipt of results from the analyzing facility. The permittee should not be found to be in non-compliance if unable to provide the required information due to reasons beyond the permittee's control, such as failure of an analyzing facility to provide requisite results. *C. Heinig - MER Corp.*

Response: EPA will take into consideration events that lead to unexpected delays in the submission of required reports, however, EPA feels that the reporting requirements included in the final permit are reasonable, and would not expect or accept chronic delays in reporting. In fact, reporting requirements in the final permit are tighter than the draft, based on the need to make timely evaluations of monitoring results, and conduct further sampling or possible operational modifications, if conditions warrant. For example, spring video/photo monitoring results shall be submitted to EPA within 60 days of conducting the survey..

E.16. Comment: The language that refers to the submission of "non-DMR" environmental monitoring data is confusing. *C. Heinig - MER Corp.*

Response: EPA agrees that the use of the acronym DMR may be confusing in this permit when it does not refer to the Maine Department of Marine Resources. The final permit does not abbreviate the term "discharge monitoring report," which in the draft was also referred to as DMR.

E.17. Comments: EPA received several comments requesting the following specific terms in the draft permit be defined or clarified: impairment, non-toxic materials, drugs, and designated uses.
Acadia National Park, J. Pitts - Bellwether Consulting, Inc., M. Opitz - U. Maine

Response: For purposes of this permit, these terms are defined as follows:

Impairment: A water body's diminished capacity to support aquatic life.

Non-toxic materials: This term was used in the draft permit to distinguish between two established mixing zones; toxic and non-toxic. Toxic materials (or pollutants) are pollutants or combinations of pollutants, including disease causing agents, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction,) or physical deformations, in such organisms or their offspring. Toxic pollutants also include those pollutants listed by the Administrator under CWA section 307(a)(1) or any pollutant listed under section 405(d) which relates to sludge management. Non-toxic materials are pollutants which don't meet any of the criteria of a toxic pollutant, or are not listed as such under sections 307 (a)(1) or 405(d) of the CWA.

Based on public comments and additional review, EPA determined that the use of a toxic mixing zone did not ensure protection of organisms passing through this zone from lethality, or protection of water quality standards at the edge of the non-toxic mixing zone. Therefore, the final permit does not provide a specific mixing zone for toxic materials.

Drugs: Any product intended for use on Atlantic salmon (but may include other fish species) to affect the structure

or any function of the animal. This includes treatment for parasites and diseases. This definition is an abbreviated version of the definition of animal drug, as it appears in the Federal Food, Drug, and Cosmetic Act, but modified for the purpose of this permit. The FDA regulates all products used to treat Atlantic salmon as "drugs," and EPA recognizes FDA's authority over such products.

Designated Uses: Those uses specified in water quality standards for each water body or segment whether or not they are being attained. For Class SB waters in Maine, which includes Blue Hill Bay, the state, under Title 38, requires that waters be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation, and as habitat for fish and other estuarine and marine life. The habitat shall be characterized as unimpaired.

E.18. Comment: Under Section D., Narrative Monitoring, many of the conditions in this section need quantitative standards that define "impairment." As they are currently written, the conditions could not be enforced because impairment is not defined. For example, stating that the "discharge shall not cause visible discoloration" is much too subjective. Different observers could reasonably give different interpretations of the color of the water sample. In this case, the permit needs to define how color must be measured and how much change from baseline defines impairment. ***Acadia National Park*.**

Response: This section contains several of the State's narrative water quality criteria, similar to other NPDES permits issued in Maine.. EPA does not expect there to be any difficulty for the facility to meet these criteria and it does not appear necessary in this case to develop more specific and/or numeric limits to ensure that the narrative criteria are met. For example, since water discoloration is not anticipated to be a problem associated with the discharge from this facility, no numeric limit was established. If new information suggests that there is indeed a reasonable potential to cause discoloration beyond the water column mixing zone, then EPA can modify the permit to include specific monitoring and limitations on water discoloration, turbidity, or any other pollution parameter identified in the narrative limitations. The draft permit did include a numeric limit for fish in the "narrative limitations," but it has been removed in the final permit, and a related limit for feed has been included under "effluent limitations".

E.19. Comment: If the salmon farm is negatively impacted by aquatic and upland activities in the bay, do the same criteria apply as relates to violations of the water quality standards? Water quality is paramount in the culture of aquatic organisms, therefore negative farm practices will degrade or destroy the crop (the purpose of the farm) first and therefore a poorly operated farm is self-limiting. This is not the case from most upland and aquatic activities, except perhaps over fishing. How will fishing, recreational, and residential construction and habitation be addressed in concurrence with this proposed draft NPDES permit and how will cumulative impacts from these other "mixed-uses" be incorporated in the evaluation of salmon farming impacts? ***J. Pitts - Bellwether Consulting, Inc.***

Response: This permit does not cover any other aquatic or upland activities. Those activities which have been identified as a point source discharge subject to NPDES permits, including certain forms of upland animal agriculture covered under the CWA as "concentrated animal feeding operations," may have limits placed on their discharge of pollutants into adjacent receiving waters. EPA agrees that it is in the best interest of a salmon farm operator to maintain high water quality since salmonids are sensitive to depressed DO levels and elevated turbidity, among other things. However, water quality conditions can be maintained at acceptable levels for proper fish health and production, but conditions on the seafloor, particularly at deep sites such as Dunhams Cove, could suffer from excessive organic loading without any affect on the fish. Many upland forms of agriculture incorporate practices that allow for sustainable use of their land. Crop rotation, land fallowing, vegetative buffers, and the use of alternatives to chemical fertilizers and pesticides, are just a few examples of wise land management that benefits both the farmer and the environment, and are concepts which can be incorporated into salmon farming.

E.20. Comment: Regarding Special Condition #4, which allows personnel from federal agencies to inspect work authorized by the permit during normal operation hours, this condition does not specify the officers, or the qualifications of the officers conducting the inspections. Strict bio-security protocols have been established by both the state of Maine and the salmon industry to control and reduce risks associated with disease transmission. Unrestricted access by personnel from the above agencies (EPA, Corps of Engineers, USFWS, and NMFS) is a breach of bio-security protocols and poses a significant disease risk. Inspections must comply with established bio-security protocols and standards, and upon notification of the Maine DMR. ***M. Opitz - U. Maine***

Response: While bio-security protocols have been established for the Cobscook Bay area, EPA is not aware of any similar protocols established for Blue Hill Bay. Nevertheless, the final permit requires federal agents to follow the facility's contamination prevention procedures, should they be developed. EPA does not consider it necessary to identify in this permit the identification and qualifications of specific personnel that might visit the facility. EPA is not obliged to contact Maine DMR in advance of a site visit, however, it may coordinate with DMR or DEP in order to conduct a visit with both state and federal personnel.

F. OTHER ISSUES

F.1. Comment: There is no economic need for this farm in this area. There is a labor shortage. ***R. Bauer***

Response: The extent to which there is an economic need for the project is not within the scope of issues EPA may evaluate in making its permit issuance decision.

F.2. Comment: The National Park Service and other commentors expressed concern that, among other things, noise, light, debris and other forms of pollution will jeopardize the serenity of Park Service property. Other commentors expressed similar concerns about possible trespass on surrounding beaches including those owned by the park, pollution and/or debris from an existing facility on nearby beaches, and expressed concern that the permittee has not been responsive to requests to remove equipment or other debris stored on nearby beaches. The Park Service suggested that the terms of its agreement with Acadia Aquaculture be incorporated as conditions into the permit.

Response: Issues related to noise, light, trespass, and debris on upland areas are beyond the scope of EPA's CWA permitting authority. Therefore the provisions in the agreement between the National Park Service and Acadia Aquaculture have not been adopted as NPDES permit conditions. However, for informational purposes, Section N of the permit contains a description of the agreement between the parties regarding noise, light and debris.

In addition, the existing facility operated by the permittee has been inspected by EPA personnel, and EPA has discussed and received assurances from the permittee that all existing equipment and/or debris from the permittee's existing facility has been removed from surrounding beaches. This was confirmed by Park Service personnel who inspected the shoreline adjacent to the permittee's Hardwood Island site during the summer of 2001.

F.3. Comment: EPA should impose a moratorium on new or expanding aquaculture facilities and should bring all existing facilities into compliance before issuing any new permits. EPA and DEP must license existing sites before authorizing any new sites. ***Sierra Club, NELC, K. Benedict***

Response: While we agree it is important for existing facilities to obtain and comply with permits as soon as possible, we believe it is possible to issue an environmentally protective permit for this facility in advance of permits being issued for other facilities. The Dunhams Cove site is located a significant distance from most of the other existing salmon farms Downeast. While it is near the permittee's other facility at Hardwood Island, EPA has taken

account of that fact by limiting the total combined feed from the two facilities to the historic maximum feed from the existing facility. There is no legal requirement mandating that no new permits be issued until permits for existing facilities are issued, nor are there environmental reasons in this particular case to mandate such an approach.

F.4. Comment: EPA should defer permit issuance until a salmon restoration plan is developed and effluent guidelines are promulgated. ***J. Kilbreth - Verrill & Dana***

Response: Section 402(a)(1)(B) of the Clean Water Act contemplates issuance of NPDES permits before the promulgation of effluent guidelines. If effluent guidelines are promulgated during the term of the permit, the reissued permit would include any more stringent limitations necessary to comply with such guidelines. In addition, many of the permit conditions are related to the need to meet state water quality standards and are not dependent on technology based requirements. Finally, the permit contains conditions which are sufficiently protective of the endangered salmon, as evidenced by the Services' Biological Opinion related to the permit. Therefore there is no need to delay permit issuance for the development of a comprehensive salmon restoration plan.

F.5. Comment: The permit should recognize pending guidelines, and to avoid this site from being grand fathered, the term of the permit should be limited to three or four years to coincide with issuance of the guidelines. ***J. Kilbreth - Verrill & Dana***

Response: The schedule for issuance of the guidelines is uncertain. As noted above, any more stringent limitations necessary to meet subsequently promulgated guidelines would be incorporated into a reissued permit; the current limitations would not be "grand fathered."

F.6. Comment: A better approach would be to issue an "interim NPDES permit in progress" , and have some data collected by the applicant and the more comprehensive data needs collected by the state, feds, pharmaceutical companies, industry, etc. ***J. Pitts - Bellwether Consulting, Inc.***

Comment: No activity should be allowed if there are legitimate questions regarding environmental impacts (e.g. nutrients, flushing). ***K. Benedict***

Response: EPA believes the final permit is sufficient to ensure compliance with federal and state requirements, including state water quality standards. There are stringent limitations and monitoring requirements designed to provide the information necessary to verify that adverse environmental effects do not occur. In addition, the permit can be modified in the future based on new information, including data collected by the permittee or others.

F.7. Comments: An EIS is required to assess indirect, synergistic and cumulative impacts. A full environmental assessment should be made of existing sites first. New farms should be described in an EIS using established criteria following reviews at county, state, and federal levels. EPA should voluntarily prepare an EIS. ***Sierra Club, NELC, J .Schultz, FBHB, J. Kilbreth***

Response: Under Section 511(c) of the Clean Water Act, no action of EPA may be deemed a major federal action significantly affecting the quality of the human environment (thereby triggering the requirement under the National Environmental Policy Act to prepare an EIS) except for the provision of federal financial assistance for constructing publicly owned treatment works, and the issuance of NPDES permits for new sources. The Acadia Aquaculture facility is not a "new source" within the meaning of the CWA, because no new source performance standards exist for this category of dischargers. Therefore, there is no legal requirement for an EIS to be prepared. In addition, we do not believe that the issues posed by this discharge are so substantially different from other discharges for which the Agency issues NPDES permits that a voluntary EIS is warranted. We believe the permit contains sufficient safeguards to ensure that the aquatic environment is protected.

F.8. Comment: Salmon farms are "aquaculture" within the meaning of § 318 of the CWA, and § 318 provides specific authority to EPA to strictly limit the environmental impacts of salmon farms, in addition to the authority provided in § 301 and § 402 of the CWA. ***NELC - USPIRG***

Response: EPA disagrees with the comment that the permittee's facility is an "aquaculture project" within the meaning of § 318 of the CWA (although we acknowledge that the common industry term for such facilities is "aquaculture"). Rather, this and the other salmon farms in Maine are properly characterized as concentrated aquatic animal production facilities (CAAPFs) and are regulated under 40 CFR §122.24 and Appendix C to 40 CFR Part 122. The term "aquaculture projects" has a very narrow meaning under § 318 of the CWA and the implementing regulations at 40 C.F.R. 122.25. Specifically, aquaculture projects are those facilities located in waters of the U.S. into which wastewater from industrial or municipal facilities is discharged, for the purpose of growing an aquatic crop using the pollutants in such wastewaters. This position is further explained in EPA's June 6, 2000 memorandum to the file related to Maine's NPDES permit program approval, entitled "Regulation of Fish Farms Under the Clean Water Act."

F.9. Comment: It is not clear whether the discharge would be located in inland state waters, or to the territorial sea, to which EPA's Ocean Discharge Criteria also apply. ***NELC - USPIRG***

Response: The location of the facility is landward of the baseline, not within the territorial sea, and therefore only state water quality standards, and not the Ocean Discharge Criteria, apply. NOAA chart 13312 depicts the territorial sea boundary in Blue Hill Bay as running from Naskeag Point, south of Brooklin, east to Dix Point, near West Tremont.

F.10. Comment: It would be a serious mistake to use the conditions of this permit (draft) as a template for future permits. We suggest that over this winter (2000/2001,) EPA-Region I, other federal agencies, and the DEP meet with us to review our FAMP and the operational performance of each aquaculture operation in Maine. ***Maine DMR***

Response: This permit has been developed specifically for the discharge from a concentrated aquatic animal production facility (CAAPF) in Blue Hill Bay. All future CAAPF permits will be issued by Maine DEP and reviewed by EPA to ensure consistency with the Clean Water Act (CWA). We believe this permit contains conditions necessary to protect state water quality standards and will be a useful template for evaluating new permits to be issued by DEP for existing facilities in Blue Hill Bay and other locations. We do not believe that current DMR license conditions and Corps section 10 permit conditions for existing facilities are sufficient to fully protect water quality standards. Therefore, we expect that DEP's MEPDES permits for these facilities will include additional conditions similar to those contained in this permit.

F.11. Comment: All BMPs (best management practices) should conform with the FAO (Food and Agriculture Organization) Aquaculture Code of Conduct [for Responsible Fisheries], unless and until the US Code now being developed is complete and exceeds FAO standards. ***V. Newman - Sierra Club***

Response: EPA reviewed the FAO Code of Conduct for Aquaculture Development (Code), and concluded that the goals outlined in this document focus primarily on the "state's" (i.e., the nation's) responsibility to address aquaculture issues in a much broader context than is appropriate for regulating the discharge from one facility. Where there are applicable issues for comparison (e.g., environmental assessment and monitoring, minimizing adverse ecological changes, use of drugs and chemicals, and conserving genetic diversity,) EPA believes that the final permit fully addresses or exceeds the FAO's recommendations. Clearly, the Code provides excellent guidance for state and federal agencies to both support and regulate aquaculture in a responsible and sustainable way, and would be a useful tool in any future management of the industry.

F.12. Comment: EPA should determine if Connors [Brothers] [now Heritage Salmon] is the de facto owner or operator of the Acadia Aquaculture facility. ***NELC***

Response: Whether or not Heritage Salmon actually "owns" Acadia Aquaculture, EPA acknowledges that in some circumstances it may be appropriate to include other entities as co-permittees, when such entities exercise substantial operational control over the permitted discharge. While EPA does not have sufficient information at present to include Heritage Salmon as a co-permittee, the Agency intends to issue an information request to Heritage Salmon to determine whether the degree of involvement would warrant a permit modification in the future to include it as a co-permittee.

F.13. Comment: Many residents of the area surrounding Blue Hill Bay firmly believe that the proposal to introduce this industrial, non-traditional activity (salmon aquaculture) into our waters is unacceptable. ***R. Slaven - Wood Point***

Response: Whether or not a specific activity is appropriate in a particular geographic area is an issue for the state to address, and beyond the scope of this discharge permit. Maine state law identifies aquaculture as a designated use in Class SB waters, which is the classification assigned to Blue Hill Bay.

F.14. Comment: We request that the EPA give consideration to the eight recommendations presented by the authors of Murky Waters: Environmental Effects of Aquaculture in the United States. ***Friends of Blue Hill Bay***

Response: EPA has reviewed this document. While it contains some very good and useful information and recommendations, the eight recommendations listed generally address environmental issues on a broader level than appropriate for a permit of a single discharger. The first four recommendations are directed at the industry, and the last four are recommendations to EPA and other federal regulatory agencies to develop proper regulatory frameworks for aquaculture, develop effluent limits, and support research and development of economically and environmentally sustainable forms of aquaculture, particularly in economically depressed communities. EPA is presently developing effluent guidelines for concentrated aquatic animal production facilities, and has been working with Maine DEP to develop discharge permits for all existing facilities that will ensure state water quality standards are met, and as such, be protective of marine and estuarine environments.

F.15. Comment: If the EPA does not have enough information to establish BAT (Best Available Technology Economically Achievable) limits than the authorization for new sites should not be allowed until enough data are available to make an environmentally sound decision regarding the impacts from salmon aquaculture sites. ***K. Benedict***

Response: As noted above, § 402(a)(1)(B) of the Clean Water Act authorizes issuance of NPDES permits before the promulgation of industry-wide effluent guidelines, including BAT. In the absence of guidelines, permits are written on the basis of best professional judgment to meet technology requirements, and to meet water quality standards. BAT focuses on treatment technologies or practices, rather than on the site specific water quality impacts of a discharge. Many of the permit conditions in this permit are related to the need to meet state water quality standards and are not dependent on technology based requirements. Finally, the permit contains conditions which are sufficiently protective of the endangered salmon, as evidenced by the Services' Biological Opinion related to the permit. Therefore there is no need to delay permit issuance for the development of BAT guidelines. The Clean Water Act does not provide for EPA to suspend issuance of permits while waiting for BAT guidelines. Without guidelines, permits are written based on best professional judgement (Section 402 (a) 1 of the CWA,) and to meet state water quality standards.